

SPECIAL PROVISIONS  
VILLAGE OF EAST TROY  
WALWORTH COUNTY, WISCONSIN

Including the following:

General Construction Procedures  
Erosion Control  
Site Grading  
Road Construction  
Sanitary Sewer  
Storm Sewer  
Water Main

Appendix

Standard Details  
Village Inspection Requirements  
Design Guidelines  
Special Conditions - Sample

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VILLAGE OF EAST TROY

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SPECIAL PROVISIONS  
VILLAGE OF EAST TROY  
WALWORTH COUNTY, WISCONSIN

SEPTEMBER 2, 2008

100. CONSTRUCTION MEANS, METHODS, SAFETY, ETC.

- A. The Contractor shall be responsible for compliance with all Federal, State and local laws, including OSHA Standards, and with any other applicable laws, ordinances, rules, regulations and orders of any public body having jurisdiction for the safety of persons or property or to protect them from damage, injury or loss. The Contractor shall provide all safeguards, safety devices and protective equipment and shall be responsible for initiating, maintaining and supervising all safety precautions and programs utilized by the Contractor and his sub-contractors in the performance of their work and shall take any other actions necessary to protect the life and health of employees on the job and the safety of the public and to protect property in connection with the performance of work on this project.
- B. The Contractor shall be responsible for the construction means, methods, techniques or procedures, equipment, and for safety precautions or programs, unless such means and equipment are specified in these Contract Documents, utilized in the performance of work on this project. The Contractor shall comply with Section 108.5, Equipment, Methods and Materials, of the "State Specifications".

101. GENERAL

- A. Definition of Work.
  - 1. The work covered by this Contract(s) shall consist of furnishing all labor, equipment, tools, supervision, machinery, supplies and all materials necessary to complete all work shown on the plans and described in these Special Provisions.
  - 2. Plans.
    - a. The work is described in these Special Provisions and shown on the Plans identified \_\_\_\_\_.
    - (1) The plans are dated \_\_\_\_\_, with final revisions dated \_\_\_\_\_.

3. Plans/Specifications at Project Site.

a. The Contractor shall have a complete set of plans and specifications at the project site at all times. Specifications shall include:

- (1) Project manual, including Special Provisions;
- (2) "Standard Specifications", if applicable;
- (3) "State Specifications";
- (4) Village of East Troy "Special Provisions";
- (5) Other documents pertaining to the project.

B. Specifications.

1. These Village of East Troy "Special Provisions", as supplemented by the "Standard Specifications" and "State Specifications" noted below, will govern all work performed on Village of East Troy projects.

a. Definitions.

- (1) Village - The Village of East Troy.
- (2) Developer - The Owner or Developer of the project being constructed.
- (3) Owner - Generally interpreted to mean the Village but could also refer to the Developer.
- (4) Engineer - Generally interpreted to mean the Village Engineer but could refer to the Developer's Engineer.

2. The "Standard Specifications for Sewer and Water Construction in Wisconsin", Sixth Edition, December 22, 2003, with Addendum No. 1, or the latest edition or current addendum(s), will govern all utility work performed on this project and hereinafter will be referred to as the "Standard Specifications".

3. Utility Projects:

a. All references to "State Specifications" refer to the State of Wisconsin, Department of Transportation, "Standard

Specifications for Highway and Structure Construction”, 2008 Edition, and all “Interim Supplemental Specifications”.

- (1) All references to the “Department” or “State” (The “Department” of Transportation of the “State” of Wisconsin) shall be interpreted to mean the Village of East Troy.
- (2) All references to metric unit(s) shall be converted to their nearest whole equivalent Standard unit(s) (U.S. Standard) in accordance with the conversion tables shown in the Appendix of the “State Specifications”. Any necessary adjustments or interpretations shall be made by the Engineer.

4. Road Projects:

- a. The State of Wisconsin, Department of Transportation, “Standard Specifications for Highway and Structure Construction”, 2008 Edition, and all “Interim Supplemental Specifications”; will govern all road work performed on this project and hereinafter will be referred to as the “State Specifications”.

- (1) All references to the “Department” or “State” (The “Department” of Transportation of the “State” of Wisconsin) shall be interpreted to mean the Village of East Troy.
- (2) All references to metric unit(s) shall be converted to their nearest whole equivalent Standard unit(s) (U.S. Standard) in accordance with the conversion tables shown in the Appendix of the “State Specifications”. Any necessary adjustments or interpretations shall be made by the Engineer.

5. In the event of a discrepancy between these “Special Provisions” and either the “Standard Specifications” or the “State Specifications”, these “Special Provisions” shall govern.
6. All disputes and questions regarding interpretations of any specifications will be resolved by the Village or its representative.
7. Copies of the “Standard Specifications for Sewer and Water Construction in Wisconsin”, Sixth Edition, may be obtained for \$45.00 each, plus \$7.50 shipping, upon request to:

Public Works Industry Improvement Program  
2835 N. Mayfair Road, Suite 35  
Milwaukee, WI 53222

Phone: (414) 778-1050

8. The "Standard Specifications for Highway and Structure Construction", 2008 Edition, may be viewed for free via the internet at the following website:

<http://roadwaystandards.dot.wi.gov/standards/stndspec/index.htm>

9. Hard copies or CDs of the "Standard Specifications for Highway and Structure Construction", 2008 Edition, may be ordered from the WisDOT by downloading their order form available at the following website:

<http://roadwaystandards.dot.wi.gov/standards/stndspec/hidden/order/print.pdf>

C. Staking Line and Grade.

1. The Engineer will provide a one time staking of the project at no expense to the Contractor. Additional staking will be performed by the Engineer at a per diem charge-out rate. Notification of at least two (2) days is required when making periodic requests for line and grade.

D. Alternate Materials.

1. The Contractor may furnish alternate materials in place of those specified in these Special Provisions where "or equal" is stated and when the following provisions have been complied with.

"If the Contractor wishes to substitute an alternate material as an 'equal' to the material specified, he shall first submit a detailed description of such to the Village for its review and approval/disapproval. The Contractor shall not install any alternate materials prior to receiving approval for their use. Only those materials listed in these Special Provisions or approved as alternates may be used on this project."

E. Work Schedule.

1. The Contractor shall complete the work in accordance with the schedule specified in the Proposal. The Contractor may be required to provide a construction schedule prior to beginning work on this project.

2. Work Sequence.
  - a. Install erosion control devices prior to beginning other work on this project.
  - b. Strip all topsoil from within street right-of-ways prior to beginning utility construction.
  - c. Optional - rough grade roadways and site grading areas.
  - d. Install utilities.
  - e. Complete roadway and site grading.
  - f. Place salvaged topsoil and complete lawn restoration.
3. New Subdivision Construction Schedule.
  - a. General.
    - (1) Complete all grading and utility work, except for asphaltic pavement and sidewalk, by October 15<sup>th</sup> of the year that work began.
    - (2) Lawn restoration not completed by October 1<sup>st</sup> shall be completed by the following May 15<sup>th</sup>.
  - b. Asphaltic Paving.
    - (1) Initial Lift.
      - (a) Place the first lift of asphaltic pavement by November 1<sup>st</sup> of the year that utility and road improvements are constructed.
      - (b) Place manhole covers and valve boxes 1/4 inch below the finished grade and protect with 3 foot (radius) asphaltic wedges. Optional - May turn valve boxes down.
      - (c) Protect edges of concrete gutter by ramping up to match the top edge (flange) of gutters.

- (2) Final Lift.
  - (a) Place the final lift of asphaltic pavement after 75% of the homes have been completed, but not later than two years after the binder course is placed, unless otherwise directed by the Village.
  - (b) Remove wedges and ramps by milling prior to placing the surface course.
  - (c) The final lift of pavement shall be placed no later than October 15th.

c. Sidewalk.

- (1) Sidewalks shall be constructed on individual lots after each house has been completed, but prior to occupancy – weather permitting, unless otherwise approved by the Village.
- (2) Sidewalks shall be installed before any hard surfaced drives are constructed.
- (3) Sidewalk construction delayed by weather shall be completed by the following June 15th.

d. Cold Weather Work.

- (1) Refer to Section 604 of these Special Provisions for cold weather scheduling.

4. Construction Working Hours.

- a. The Contractor may only work within the times noted below unless otherwise approved by the Village. These hours only apply to Contractor's operations that create noise levels that could negatively affect adjacent properties.
  - (1) Weekdays - 7:00 a.m. to 6:00 p.m.
  - (2) Saturday - 8:00 a.m. to 5:00 p.m.
  - (3) Sunday - No Work Allowed.

F. Village Inspection.

1. During Construction.

- a. The Village will periodically inspect the project to ensure that it is proceeding in accordance with plans and specifications; two items of particular concern are listed below.

2. Erosion Control.

- a. No work may begin until after all erosion control devices are installed and approved. Refer to Section 650 of these Special Provisions for additional requirements.

- b. Silt Fence Maintenance.

- (1) Refer to Subsection 650.G.4 of these Special Provisions for inspection and maintenance requirements.

3. Grading Stockpiles.

- a. All slopes and stockpiles shall be graded at a maximum 4:1 sideslope.

4. Notification/Stop Work.

- a. The Village or its representative will notify the Contractor in writing of any deficient items. If such deficiencies are not corrected within 10 days after the date of notification, the Village may issue a stop work order.

5. Final Inspection.

- a. Refer to Section 2500, Village Inspection, included in the Appendix for Village final inspection requirements.

G. Contractor Contact Number(s).

- 1. The Contractor shall provide 24 hour contact numbers to both the Village Police Department and the Superintendent of Public Works.

H. Cleaning Up Site.

- 1. The Contractor's attention is directed to Subsection 1.5.2 (Cleaning Up Work) of the "Standard Specifications" requiring the Contractor to keep

the site picked up and free from litter, debris, and surplus or waste materials.

2. All materials shall be stored in appropriate containers and prevented from blowing around.
3. Do not bury any kind of debris on site.

## 102. PERMITS

### A. Permits and Approvals.

#### 1. DNR Well Permits.

- a. The Contractor shall obtain well permits from the Department of Natural Resources if dewatering wells will be installed or operated for which the single or aggregate capacity will be in excess of 70 gallons per minute. Permits must be obtained before well construction can begin.

- b. The DNR's address for well permits is as follows:

Wisconsin Department of Natural Resources  
Bureau of Drinking Water and Groundwater  
Box 7921  
Madison, WI 53707

or

Contact: Mark Putra at (608) 267-7649

- c. Permit requirements:

- (1) The fee for a High Capacity Well (greater than 70 gpm) is \$500.00 and must accompany each application.
- (2) Any new well on a high capacity well property requires an approval and is subject to the fee.
- (3) Global Positioning Satellite (GPS) location data is required for all wells listed on applications.
- (4) Temporary dewatering well installations with multiple wells for one project are subject to a single \$500.00 fee.

2. Construction Pit Dewatering Discharge Permit.

- a. The Contractor shall comply with the provisions of Chapter 283.35, Wisconsin Statutes, regulating the discharge of effluent from construction pit (trench) dewatering. These provisions provide for the removal of suspended solids from dewatering effluent prior to the direct discharge to surface waters or wetlands.
- b. The Contractor shall apply to the Department of Natural Resources for a permit to discharge effluent from construction pit dewatering. This discharge may be covered by an existing General Permit for discharging Contaminated Storm Water Runoff/Or Construction Pit Dewatering. Application forms for this permit(s) may be obtained at the address shown below and are available at the Engineer's office.

Wisconsin Department of Natural Resources  
2300 North Martin Luther King Jr. Drive  
P.O. Box 12436  
Milwaukee, WI 53212

3. Village Street Opening Permit.

- a. For construction within Village streets, the Contractor shall obtain a street opening permit from the Village Building Inspector. The Contractor shall be responsible for the cost of any repairs on repaired pavements for a period of one year after final resurfacing as per Village ordinance.
  - (1) Contact the Village building inspector, Maney-Miller Inspectors in care of Scott Johnson (262-642-6260 Tuesdays and Thursdays 12:30 p.m. to 2:00 p.m. or 262-352-4433 mobile) or Vince Budiak (262-662-5355), to obtain this permit.

B. Soil Boring Permit/Approval.

1. Contractors (Bidders) shall obtain permission from the Owner prior to performing subsurface investigations. Street opening or highway permits may be required for taking soil borings within streets or highways maintained by Village, Town, County or State highway departments.
  - a. The State Department of Transportation requires a Highway Permit (Form E-M-405) including a traffic control plan for performing soil borings within State Highway right-of-ways.

2. The Contractor is reminded to contact all utilities, as well as Digger's Hotline, before performing soil boring work.
3. Soil borings shall not be taken within pavement or shoulder areas without the Owner's specific approval of same. All boring holes shall be completely filled after the work has been completed.
4. Borehole/Drillhole Abandonment.
  - a. All boreholes shall be completely filled after the work has been completed. Drillholes (boreholes) shall be abandoned in accordance with DNR regulations. Chapter NR 112, Wisconsin Administrative Code, defines drillholes as "any excavation or opening . . . deeper than it is wide that extends more than 10 feet below the ground surface."
  - b. Section NR 112.26 specifies the procedures to be used in drillhole abandonment. Drillholes shall be filled with acceptable materials as specified in Section NR 112.26(7).
  - c. An abandonment form (Form 3300 - 5b or 5w) shall be submitted to the appropriate DNR District office for each abandoned drillhole within 30 days of completion of the work.

### 103. NOTIFICATION OF UTILITIES

#### A. Utility Location and Coordination.

1. The locations of utilities shown on the Plans are from existing records and/or field locations and may not be complete or accurate. The Contractor shall contact Digger's Hotline at (800) 242-8511, as well as other utilities not served by Digger's Hotline but having facilities in the work area, at least three (3) full business days prior to construction to notify the utilities to locate their underground facilities.
2. A preconstruction meeting will be held, if required, to coordinate the work operations of the Contractor and the utility companies and resolve any conflicts that may exist.

#### B. Utility Protection.

1. It shall be the responsibility of the Contractor to protect all utilities that are encountered in his work operations. The Contractor shall contact utilities to determine their procedure and schedule for supporting and/or relocating poles and shall notify any above ground utility such as electric and telephone companies to relocate or reinforce any poles, ties or anchors

which may be on or near the line of the proposed utility or weakened by excavation for the proposed utility or within road construction grading limits. All costs of protecting existing utilities; such as tunneling, sheathing, bracing or relocation including utility company bracing and relocation charges shall be considered incidental to utility construction.

C. Utility Contacts.

1. Digger's Hotline (800) 242-8511
  - a. We Energies - Gas Operations  
Harvey Winter (262) 574-3154  
Fax (262) 574-3109
  - b. We Energies  
Steve Kern (262) 552-3279
  - c. Century Telephone  
Mark Murn (262) 392-5210  
Mike Chilson – Const. Supr. (262) 392-5270
  - d. Time Warner Cable  
Steve Cramer (414) 277-4045
2. Tom Rossmiller, Supt. of Pubic Works (262) 642-6253  
**OR** (262) 642-6254
3. Scott Johnson, Bldg. Insp. (262) 642-6260  
Vince Budiac, Asst. Bldg. Insp. (262) 662-5355  
Maney-Miller Inspectors (262) 646-8053
4. Judy Weter, Administrator/Clerk (262) 642-6255  
Ext. 225
5. Ken Walbrant, Forester (262) 642-3118
6. Wisconsin DOT Utility Locate (414) 266-1155

D. Emergency Phone Number:

1. Contractor shall provide the Village with a 24-hour emergency phone number.

104. SUBSURFACE SOIL INVESTIGATION DATA

- A. Subsurface soil investigations have been performed by \_\_\_\_\_. Copies of this information are available to Bidders upon request.

**Note: If soils data is available, it will be so noted in the Special Conditions.**

- B. There is no expressed or implied guarantee by Developer, Village, Engineer, or the Soil Testing Consultants as to the accuracy or adequacy of the subsurface soil investigations nor of the interpretation thereof. Each Bidder must form his own opinion of the character of the materials which will be encountered from an inspection of the ground, from his own interpretation of the soil boring information and from such other investigations that he may wish to employ. The subsurface soil investigation data shall be considered as a reference only and is not a part of the Contract Documents.

201. SANITARY SEWER CONSTRUCTION

- A. Bedding and Cover Material.

1. Sanitary sewer bedding and cover material shall conform to the appropriate sections of the "Standard Specifications", as specified and/or modified below:

- a. PVC pipe - Section 3.2.6.(i), as modified below (Note that the bedding section is essentially Class "B" Bedding except that a minimum of 12 inches of cover material is required over the top of the pipe.):

- (1) Bedding material used for 18" diameter or smaller sewer pipes shall conform to either Table 32 (3/8" crushed stone chips containing at least 85% machine fractured particles) or Table 33 (3/4" crushed stone chips containing at least 65% machine fractured particles) of Section 6.43.2.(a). Crushed pea gravel will not be allowed for use as bedding material. Cover material shall be the same material as used for bedding.

- (2) Delete the following sentence from Paragraphs 3.2.6.(b)(2) and 3.2.6.(i)1.:

"If crushed stone chips or other materials conforming to Section 6.43.2.(a) are used as cover material, no compaction or staging is required."

(3) Placement and Compaction.

- (a) Place bedding material to the springline of the pipe and compact prior to placing cover material. Compaction of bedding material at the level of the pipe springline shall include working bedding material under the haunches of the pipe using shovels or other suitable methods. The Contractor shall take care to completely work bedding material under the haunches of the pipe to provide adequate side support.
- (b) Place and compact cover material in one or more lifts after compacting bedding material. Place a minimum of 12 inches of cover material over the pipe.
- (c) Refer to Subsection 607.B. of these Special Provisions for requirements for recompacting Class "B" bedding disturbed by trench boxes.

B. Laterals.

1. Connections to the Main Sewer.

- a. Building sewer (lateral) connections to the main sewer shall be made with wyes except as noted below. The ends of laterals shall be plugged in accordance with Paragraph 3.2.5.(f) of the "Standard Specifications".
  - (1) All lateral connections to new PVC pipe shall be made with factory fabricated or injection molded in-line wyes unless otherwise approved by the Engineer.
- b. Place wyes at a typical vertical angle of 45° to the horizontal except install wyes flat or level when the Plans state to install laterals as low as possible.

2. Grade.

- a. Install sewer laterals at a typical 2.08% (1/4"/ft.) grade unless shown otherwise on the Plans. Minimum lateral grade is 1.04% (1/8"/ft.).

3. Bore Laterals Under Existing Roadways.
  - a. Sanitary sewer laterals shall be installed by boring under existing pavement and shoulder areas.
4. Marker Stakes.
  - a. The Contractor shall furnish and install a marker stake over the end of each lateral installed. The marker shall be a minimum 2" x 4" x 8' wooden plank or as approved by the Engineer. The marker shall be placed vertically with its top flush with the surface grade. Place a spike with a large washer or other durable magnetic material in the top of the marker stake to aid in future relocation.
    - (1) New Subdivisions. Place two marker stakes at the end of each lateral installed. Bury one stake vertically with its bottom at the top of the sewer bedding material and place the second stake as indicated above.
5. Risers.
  - a. Flexible Riser to Flexible Sewer Main 8" Through 18" Diameter (Shallow Sewers).
    - (1) Risers on shallow flexible gravity sewer mains shall be constructed of flexible gravity sewer pipe in accordance with File No. 10E of the "Standard Specifications".
      - (a) Use File No. 10E for risers up to 6 feet in height or for mains not exceeding 16 feet in depth measured from the flowline of the sewer.
    - (2) Riser connections shall be made with factory fabricated or injection molded in-line tees. Do not use saddles for riser connections.
  - b. Flexible Riser to Flexible Sewer Main (Deep Sewers).
    - (1) Use any of the following methods for constructing risers on "deep flexible sewer mains" where the riser is greater than 6 feet in height or the sewer main is greater than 16 feet in depth measured from the flowline of the sewer.
      - (a) Construct risers using flexible pressure pipe, AWWA C-900-DR18, connected to a ductile iron tee installed on a flexible main (8", 10", 12", and

18") diameter in accordance with the details in the Appendix.

- (b) Construct risers using flexible gravity sewer pipe, ASTM 3034-SDR 26, encased within a corrugated polyethylene drainage tubing installed on a flexible main (15" diameter) in accordance with the details in the Appendix.
- (c) Install risers using flexible gravity sewer pipe, ASTM D-3034, SDR 35, on a 1:1 slope in accordance with the details in the Appendix.

Note: This method may also be used for shallow sewer risers.

6. Cleanouts.

- a. All laterals exceeding 100 feet in length shall have cleanouts installed on them. Cleanouts shall be placed at 100 foot maximum spacings as shown on the Plans or as directed by the Engineer. They shall be constructed in accordance with the details shown on the Plans or included in the Appendix.

7. Sampling Manholes.

- a. Construct a sampling manhole on all sewer laterals serving commercial and industrial sites. "No Exceptions".
  - (1) Where one building has multiple users (more than one business), each user requires a separate sampling manhole. Optional: In lieu of constructing additional inspection manholes, place 12" riser ports consisting of a 12" tee placed on the 4" or 6" lateral with a 12" riser for each additional user accessible to the Village. Note that one sampling manhole is still required for each building.
- b. Place sampling manholes outside of the right-of-way on private property or as directed by the Village.
- c. Manhole.
  - (1) Construct the sampling manhole in accordance with Section 210 of these Special Provisions except as specified below.

- (2) Construct the manhole bench to the top of the pipe O.D.
- (3) Construct a 1 inch weir slot (1 inch wide by pipe O.D. depth by pipe O.D. width plus 2 inches) using two 1/4" stainless steel guides. Place 6 inches from downstream edge of manhole. Break the sewer lateral pipe to provide 1 inch separation at the weir.
- (4) Place the manhole in a straight length of lateral to provide 10 feet of straight piping each side of the manhole.

8. Abandoning Laterals.

- a. Abandon laterals by plugging the lateral at the main line wye or tee and sealing the abandoned pipe with a 6-inch concrete plug.

C. Connections to Existing Sewers and Manholes.

1. Sewer Stub Connections.

- a. Sewer connections to existing sewer stubs of different type of material or joint shall be made with approved watertight adaptors.

2. Manhole Connections.

- a. Sewer connections to existing manholes shall be made in accordance with Section 3.5.7. of the "Standard Specifications". Field tapped holes for connecting sewer pipe to manholes shall be made by coring the manhole except that connections to brick or block manholes may be made by punching out the opening. Flexible pipe connections shall be made with flexible watertight connectors, Kor-N-Seal, Link-Seal or equal. All clamps, bolts, etc. of pipe to manhole seals shall be stainless steel. If Link-Seal connectors are used, the bolt heads shall be placed on the inside of manholes.
- b. Form new flow lines in existing manholes in accordance with File No. 13 of the "Standard Specifications".

3. Lateral Connections.

- a. Lateral connections to existing sewers shall be made with INSERTA-TEE brand three-piece service connection or approved equal. The service connection shall include a PVC hub conforming to the requirements of ASTM D3034-SDR 26, rubber sleeve conforming to ASTM C477, and stainless steel band.

4. Plug Downstream Manhole.

- a. Place temporary plugs in all downstream (receiving) manholes to prevent groundwater and debris from entering the existing sewer system. Any damage to downstream facilities caused by excessive water or debris shall be repaired at the Contractor's cost.

D. Pipe Flotation.

- 1. Pipes installed below the groundwater elevation shall be protected against flotation. The Contractor shall lower the groundwater elevation until after adequate cover has been placed to secure pipes.

E. Deflection Testing.

- 1. Polyvinyl chloride (PVC) sewer pipe shall be deflection tested with an approved go-no-go acceptance testing device. The test shall not be conducted until after all backfill has been placed and consolidated and after riser pipes and sewer laterals have been installed. The entire length of sewer pipe shall be tested.

- a. PVC pipe shall be deflection tested in accordance with Paragraph 3.2.6.(i)4. of the "Standard Specifications", as amended below:

- (1) Initial deflection testing shall be done using a 95% mandrel. The use of a 92.5% testing device will not be allowed for initial testing regardless of the time elapsed after backfilling.

- (a) PVC pipe shall not be deflection tested until at least 14 days after all backfill has been placed, including backfilling of laterals and risers, wherever the depth of cover exceeds 15 feet.

- (2) All sections failing to pass the test shall be repaired and retested, however, if at least 30 days have elapsed since the pipe was placed and backfilled, the Contractor will be allowed to retest the sewer line using a 92.5% mandrel.

2. Mandrels.

- a. Go-no go mandrels shall conform to the requirements of File No. 30 of the "Standard Specifications".

F. Leakage Testing.

1. Low Pressure Air Test.

- a. Amend Paragraph 3.7.1. of the "Standard Specifications" to read in part: "Sanitary sewers less than or equal to 36 inches in diameter shall be tested for leakage using the low pressure air test. The length of laterals included in the test section shall be included in determining the test time."

G. Insulation.

1. Sewer lines shall be insulated where noted on the Plans and wherever the depth of cover is less than five (5) feet when so ordered by the Village. Insulation shall be in accordance with Chapter 4.17.0. of the "Standard Specifications" and the details in the Appendix to these Special Provisions.

H. Sewer Stub Inspection.

1. All sewer stubs shall be visually inspected by lamping. Long sewer stubs shall be lamped from both ends of the pipe as required.
2. The pipe shall be inspected for leakage, excessive deflection, offset joints, or any other unacceptable condition. The Contractor shall furnish an adequate light and provide safe access to both ends of the pipe. All leaking joints and other defects shall be corrected. All costs associated with correcting any unacceptable conditions shall be paid for by the Contractor.
3. Existing Stubs.
  - a. The Contractor shall inspect existing stubs as specified in Paragraphs 1 and 2 above.
  - b. In addition to the visual inspection, the Contractor may test the existing stub(s) for leakage and deflection to ensure that defects in the existing stub do not adversely affect the testing of the new adjoining sewer. Note that existing stubs will be tested with the new sewer when the new sewer line is tested.

I. Televising Sewers.

1. The Contractor shall televise all sewers (sanitary and storm) after successfully completing deflection and leakage testing and after forming manhole flowlines and benches.

- a. Notify the Village at least 3 days prior to televising.
  - b. A representative of the Village's Public Works Department will be on site during sewer televising.
2. The Contractor shall provide the Village with a copy of the videotape on DVD and a written report by the video contractor. The report shall include the following information:
  - a. Location and date.
  - b. Manhole numbers.
  - c. Lateral locations (distances from manhole) and directions cross-referenced to lot numbers or street addresses.
  - d. Defects, i.e.; bad joints, cracked pipe, infiltration, standing water, debris in pipe, etc.
3. All defects shall be corrected and any dirt, gravel or foreign material removed from the sewer prior to acceptance by the Village.

## 205. SANITARY SEWER MATERIALS

- A. Sanitary sewer pipe material shall be polyvinyl chloride (PVC) pipe conforming to the following:
  1. Polyvinyl chloride (PVC) sewer pipe, 4 inch through 15 inch diameter, meeting the requirements of ASTM D-3034, SDR-35, with integral bell type flexible elastomeric joints meeting the requirements of ASTM D-3212. PVC material shall have a cell classification of 12454-B, 12454-C, 12364-C or 13364-B, except that 12364-C and 13364-B shall have a minimum tensile modulus of 500,000 psi.
  2. Polyvinyl chloride (PVC) large diameter solid wall sewer pipe, 18 inch through 27 inch diameter, meeting the requirements of ASTM F-679, Type T-1, with a minimum pipe stiffness of 46 psi and having integral bell type flexible elastomeric joints meeting the requirements of ASTM D-3212. Lateral pipe material shall conform to the requirements of Paragraph 1 above. PVC material shall have a minimum cell classification of 12364-C or 12454-C.

B. Well Protection.

1. Sanitary sewer pipe material located within 25 to 50 feet of private wells, as shown on the Plans or as directed by the Village, shall be pressure pipe as specified below. The pressure pipe shall be PVC pipe unless ductile iron pipe is specified on the Plans or by the Village.
  - a. Polyvinyl chloride (PVC) pressure pipe conforming to AWWA C-900, Class 150, DR-18, or ASTM D2241, CL 250, SDR-17, with integral elastomeric bell and spigot joints.
  - b. Ductile iron pipe, Class 52, meeting the requirements of AWWA C-151 (ANSI 21.51), cement mortar lined with internal and external bituminous coating and furnished with push-on joints with rubber gaskets.
    - (1) Ductile iron pipe and/or fittings shall be wrapped with polyethylene wrap meeting the requirements of AWWA Standard C-105 (ANSI A21.5) using Class C (black) polyethylene material and shall be installed as specified in Chapter 4.4.4. of the "Standard Specifications". Fold and tape loose wrap material to minimize air entrapment which could cause the material to be punctured when backfilling.
2. The pressure pipe shall be installed from manhole to manhole (entire manhole section) on manhole section(s) passing within 50 feet of private wells. Main line wye and tee lateral connections shall be pressure pipe, but laterals and risers may be constructed of gravity sewer pipe materials.
3. Laterals.
  - a. Sanitary sewer lateral pipe material within 8 to 25 feet of private wells shall be plastic sewer pipe conforming to the requirements for PVC sewer pipe of this Section of the Special Provisions.
4. Public Wells.
  - a. The pressure pipe shall be installed from manhole to manhole (entire manhole section) on manhole sections passing within 50 to 200 feet of public wells.
  - b. The pressure pipe shall be tested for leakage using a combination leak/pressure test in accordance with Chapter 4.15.0 of the "Standard Specifications". The minimum test pressure shall be 50 psi.

C. Tracer Wire.

1. Refer to Section 635.

210. SANITARY MANHOLES

A. Standard Manhole.

1. Sanitary manholes shall be constructed in accordance with Chapter 3.5.0. and File Nos. 12 12A, 13 and 15 of the “Standard Specifications” and these Special Provisions.
  - a. Poured Manhole Base.
    - (1) All manhole bases (benches) shall be poured in place in accordance with Subsection 3.5.5.(b) of the “Standard Specifications”. Precast manhole bases or precast integral base units will be allowed, however, no precast base units with preformed benches are allowed.
  - b. Cone Dimension.
    - (1) The top dimensions of cone sections shall be 24 inches inside diameter by 36 inches outside diameter.
2. Manholes shall be precast 48 inch inside diameter with eccentric cones.
  - a. Manhole depths shown on the Plans are approximate only, unless the cover elevation is indicated. Manhole covers shall be placed to match the existing grade unless the finished elevation is shown on the Plans.
    - (1) Place manhole covers 1/4 inch below the finished pavement grade in streets.
  - b. Revise Chapter 6.38.0 of the “Standard Specifications” to require that concrete brick and block, if required, shall be colored “red or pink”, conforming to Subsection 519.2.3 of the “State Specifications”.
3. Manhole steps shall be OSHA approved and fabricated using 3/8” minimum diameter steel reinforcing rod with molded plastic covering.

4. Manhole Frames and Covers.
  - a. Manhole frames and covers shall be Neenah R-1580 (old R-1080) with Type "B" self-sealing lids, non-rocking, with concealed pickholes, or equal. Manhole frames shall be centered on the top of the cone.
5. Adjusting Rings.
  - a. A minimum of 3 inches to a maximum of 18 inches of adjusting rings shall be furnished for each manhole unless shown otherwise on the Plans. Place a maximum of 5 adjusting rings on manholes. Use thickest rings available to minimize the number of rings.
  - b. Center adjusting rings on manhole cones and center manhole castings on adjusting rings so that their surfaces will be flush whenever possible.
  - c. Dimensions.
    - (1) Adjusting rings shall be 24 inches inside diameter by 36 inches outside diameter.
    - (2) Adjusting rings shall have flat or even bearing surfaces providing bearing contact over the entire contact surfaces.
  - d. Material.
    - (1) Adjusting rings shall be concrete, unless specified otherwise below, meeting the requirements of Subsection 8.39.11 of the "Standard Specifications".
    - (2) Rubber Adjusting Rings.
      - (a) The top adjusting ring on manholes subject to traffic loadings shall be rubber as manufactured by Infra-Risers, Adaptor, Inc., or equal. Use tapered adjusting rings singly or in combination to place the manhole casting truly parallel with the plane of the pavement. Install adjusting rings in accordance with the manufacturer's instructions using the recommended adhesive.

B. Frame/Chimney Joints.

1. Type II (Standard Manhole).

- a. All sanitary manholes shall be constructed with Type II frame/chimney joints unless specified otherwise on the Plans. Type II joints shall consist of the following:

- (1) Adjusting rings and manhole frames shall be set with both butyl rubber sealant and non-shrink grout (two product system) as follows. The butyl rubber sealant shall be EZ-Stik or Kent-Seal Butyl base sealant in trowelable grade or equal and applied in a 1/4 inch thick layer to the outside one-inch of the six-inch wide horizontal surface of all adjusting rings and cone section. A non-shrink grout mix in a 1/4 inch thick layer shall be applied to the remaining five inches of inside horizontal surface of all adjusting rings and cone section.

(a) Non-Shrink Grout.

- 1) Grout shall be a premixed, non-metallic; cementitious controlled expansion, high strength, versatile non-shrink grout; Penngrout by IPA Systems, Inc. or equal.

(b) Tuck point all internal mortar joints.

2. Sealing Manhole Chimneys.

- a. The entire outside surface of the manhole chimney, including all adjusting rings and overlapping both the manhole cone or flat-top slab (a minimum of 4 inches) and the manhole frame, shall be covered with a minimum 1/4 inch thick coating of butyl rubber sealant. The butyl rubber sealant shall be EZ-Stik or Kent-Seal butyl base sealant in trowelable grade or equal.
- b. Seal only the lower portion of the chimney, from the bottom of the external rubber seal to 4 inches below the top of the cone, on Type I frame/chimney joints (external seal) for waterproof manholes.

3. Polyethylene Wrap.

- a. A triple layer of eight (8) mil polyethylene wrap shall be applied around the manhole from the top of the frame to a minimum depth of 84 inches. The wrap shall extend at least 18 inches below the

cone section. The wrap shall be applied as a bag or a sheet wrapped around the manhole in a continuous manner with seams bonded with waterproof tape.

4. Manhole Cone Inspection.

- a. All manhole cone construction work shall be inspected by the Engineer. This work includes setting rings and castings (critical), sealing chimneys, and placing polyethylene wrap.
- b. Provide at least 24 hours notice to the Engineer prior to constructing manhole cones.

C. Manhole Riser Joints.

1. Joints for precast manhole riser sections shall be made with rubber "O"-ring gaskets, a continuous ring of butyl rubber sealant (EZ-Stik or Kent-Seal in rope form) or equal. The butyl sealant shall be 1 inch diameter equivalent or as recommended by the manhole manufacturer.

D. Manhole Lifting Holes.

1. All lifting holes in precast manhole sections shall be plugged using rubber plugs supplied by the manhole supplier, non-shrink grout or other approved method. Non-shrink grout shall fill the entire void and shall be troweled at each face to provide smooth surfaces. Cement mortar shall not be used to plug lifting holes.

E. Manhole Pipe Connections.

1. Connections of pipes to manholes shall be made in accordance with Section 3.5.7. of the "Standard Specifications". All field tapped holes for connecting sewer pipe to manholes shall be made by coring.
2. All plastic pipe shall be connected to manholes by means of flexible watertight pipe to manhole seals in accordance with Subsection 3.5.7.(c). Manhole seals shall be Kor-N-Seal, Link Seal or equal. All clamps, bolts, etc. of pipe to manhole seals shall be stainless steel. If Link Seal connectors are used, the bolt heads shall be placed on the inside of manholes.

F. Drop Manholes

1. All drop manholes, unless shown otherwise on the Plans, shall be constructed as "outside" drop manholes in accordance with Section

3.5.8.(d) and File No. 19 or 20 of the “Standard Specifications” and the requirements of these Special Provisions.

2. “Inside drop” manholes shall not be constructed without prior approval by the Village. Where “inside drop” connections are allowed, the concrete benches shall be made to slope up to meet the invert of all pipe connections.

G. Waterproof Manholes (Where Specified).

1. Waterproof manholes shall be constructed the same as standard manholes except that they shall be furnished with waterproof frames and lids and Type I frame/chimney joints.
  - a. Waterproof frames and lids shall be Neenah R-1755-C with Type “C” lid (and security saddle plate) or equal.
  - b. The Contractor shall also furnish 1 heavy duty padlock for each waterproof manhole and 3 matching keys fitting all padlocks. Padlocks shall be “Master” 1-1/2 inch steel padlocks, No. 3-D, with pin tumbler, or equal. Locks shall be keyed per Village instructions.
2. Furnish manholes to minimize the chimney height required, so that chimney seal extensions will not be required. Note that a standard 9 inch seal covers a 6-1/2 inch chimney height.

H. Force Main Discharge Manholes.

1. All manholes into which sewage force mains discharge shall be protected with two coats of coal-tar epoxy in accordance with Chapter 6.7.0 of the “Standard Specifications”.
2. The entire inner concrete surface of the manhole, including concrete flow lines and bench but excluding manhole steps and casting, shall be coated. Precast manhole bases with preformed benches may be furnished to allow for precoating at the concrete plant.

I. Sewer Stubs/Bulkheads.

1. Sewer stubs, where the length is not shown on the Plans, shall be 4 foot minimum length and shall be plugged in accordance with Section 3.2.25.(a) of the “Standard Specifications”.
2. Bulkheads for future sewer connections to manholes, where called for on the Plans, shall be made in accordance with File No. 13A of the “Standard

Specifications". Connections for future sewer connections 27 inches in diameter and larger shall be bulkheaded with an 8 inch wall using concrete brick.

J. Manhole Marker Posts (Where Required).

1. The Contractor shall furnish and place steel fence posts (one required) to mark manholes located as directed by the Village. Marker posts shall be heavy duty angle steel posts, 1" x 1" x 7/64" by 7 feet long and painted with a red acrylic enamel finish.

K. Manhole Infiltration Inspection.

1. The Contractor, accompanied by the Village or its Representative, shall reinspect all manholes approximately 6 months after completing work on this project to check for manhole infiltration and to observe the general condition of the manhole. All active or flowing leaks and any other necessary repairs shall be corrected prior to final acceptance of the work.
2. The Contractor shall contact Mr. Tom Rossmiller, Public Works Superintendent, at (262) 642-6253, to coordinate the timing and scheduling of this work.

L. Manhole Air Vents.

1. The Contractor shall construct manhole air vents at the locations shown on the Plans and/or as directed by the Engineer. Manhole air vents shall be constructed in accordance with the details shown on the Plans or included in the Appendix.

M. Asphaltic Pavement Placement.

1. Where asphaltic pavement is placed around manhole rims, the top of manhole castings shall be set 1/4 inch below the finished asphaltic grade.
  - a. If only the binder course of asphaltic pavement is being placed in the first year, then all manhole rims shall be surrounded by an asphaltic pavement wedge that is a minimum of 3 feet wide. This asphaltic wedge shall be placed within 24 hours of the placement of the binder course.
  - b. Asphaltic wedges shall be removed prior to placement of the asphaltic surface course.

#### 401. STORM SEWER CONSTRUCTION

##### A. Bedding Sections.

##### 1. Reinforced Concrete Pipe.

- a. Reinforced concrete pipe shall be installed using Class "B" Bedding unless Class "A" or Class "C" Bedding is specified on the Plans.

##### 2. Flexible Pipe (PVC or HDPE Pipe). **[Only With Village Approval]**

- a. Polyvinyl chloride (PVC) and high density polyethylene (HDPE) pipes shall be installed using Class "B" Bedding.

##### 3. Class "B" Bedding.

- a. Class "B" Bedding shall conform to File No. 4 and Paragraph 3.2.6(b) (concrete pipe) or Paragraph 3.2.6(i) (PVC and HDPE) of the "Standard Specifications".

- b. Delete the following sentence from Paragraph 3.2.6(b)(2):

"If crushed stone chips or other materials conforming to Section 8.43.2(a) are used as cover material, no compaction is required."

- c. Amend Section 8.43.2(a) to state that crushed pea gravel is not acceptable as bedding material.

- d. Cover material shall be the same material as used for bedding and shall conform to Section 8.43.2(a).

- (1) Bedding material used for 18" diameter or smaller sewer pipes shall conform to either Table 32 (3/8" crushed stone chips containing at least 85% machine fractured particles) or Table 33 (3/4" crushed stone chips containing at least 65% machine fractured particles) of Section 8.43.2(a).

- e. Placement and Compaction.

- (1) Place bedding material to the springline of the pipe and compact prior to placing cover material. Compaction of bedding material at the level of the pipe springline shall include working bedding material under the haunches of the pipe using shovels or other suitable methods. The Contractor shall take care to completely work bedding

material under the haunches of the pipe to provide adequate side support.

- (2) Place and compact cover material in one or more lifts after compacting bedding material.
- (3) Refer to Subsection 607.B of these Special Provisions for requirements for recompacting Class "B" bedding disturbed by trench boxes.

4. Class "C" Bedding.

- a. Class "C" Bedding shall conform to File No. 3 and Paragraph 3.2.6(a) of the "Standard Specifications".
- b. Amend File No. 3 and Paragraph 3.2.6(a) to require cover material to 12 inches over the top of the pipe.
- c. Bedding Material.
  - (1) Bedding material shall conform to Subsection 8.43.2 of the "Standard Specifications", as modified below.
    - (a) Amend Section 8.43.2(a) to state that crushed pea gravel is not acceptable as bedding material.
    - (b) Bedding material used for 18" diameter or smaller sewer pipes shall conform to either Table 32 (3/8" crushed stone chips containing at least 85% machine fractured particles) or Table 33 (3/4" crushed stone chips containing at least 65% machine fractured particles) of Section 8.43.2(a).

B. Pipe Fittings.

1. The cost of furnishing and installing fittings such as tees, plugs, bends and reducers shall be included in the unit price(s) bid for storm sewer pipe.

C. Field Tile Connections.

1. All field tile encountered during construction shall be connected to the new storm sewer wherever possible.
  - a. Tile lines crossed by the trench shall be replaced with polyvinyl - chloride (PVC) sewer pipe meeting the requirements of ASTM D-3034, SDR-35, with rubber gasket joints. The PVC pipe shall

extend for a minimum distance of 2 feet outside of the edge of the undisturbed trench wall. The tile to PVC pipe connection shall be made with compatible fittings, adapters or encased in concrete. The size of the new pipe shall be equal to or greater than the field tile it is connected to.

- b. All damaged field tile shall be repaired and connected to the storm sewer the same day as the damage occurs so that the flow of water will not be unreasonably restricted.

D. Pipe Joint Restraint (Outfalls).

- 1. Secure the last two pipe sections, including end sections, at all storm sewer outfalls (discharge points) using joint ties in accordance with the Standard Detail Drawings shown in the Appendix.

E. Sump Pump Lateral Connections.

- 1. All sump pump lateral and/or roof drain discharge lines shall be connected to the new storm sewer in accordance with these specifications and the typical details shown on the Plans. The size and location of existing sump pump laterals are shown on the Plans. Laterals located in the field during construction, but not shown on the Plans, shall also be connected to the new storm sewer.
- 2. Sump pump lateral material shall be polyvinyl chloride (PVC) pipe conforming to the following:
  - a. PVC pressure pipe meeting the requirements of ASTM D-2241, SDR-26, 160 psi, with solvent cement joints and Schedule 40 fittings.
  - b. PVC pressure pipe meeting the requirements of ASTM D-1785, Schedule 40, with solvent cement joints.

F. Deflection Testing.

- 1. Flexible sewer pipes (PVC and HDPE) shall be deflection tested with an approved go-no-go acceptance testing device in accordance with the general requirements of Paragraph 3.2.6(i)4 of the "Standard Specifications" as modified for the specific pipe material and as amended below.
- 2. Conduct the test after all backfill has been placed and consolidated and after overlying roadway base course material has been placed and compacted. Test the entire length of main line sewer pipe. Catch basin

leads need not be tested. An optional visual inspection may be instituted for the deflection test if approved by the Engineer.

3. Initial testing shall be done using a 95% mandrel regardless of the time elapsed after backfilling. All sections failing to pass the test shall be repaired and retested. If at least 30 days have passed since backfill and base course have been placed and compacted, including backfilling of repaired sections, a 92.5% testing device may be used.

G. Televising Storm Sewers.

1. The Contractor shall televise all storm sewers after successfully completing deflection and leakage testing, after forming manhole flowlines and benches, and after placing the road base course.
  - a. Notify the Village at least 3 days prior to televising.
  - b. A representative of the Village's Public Works Department will be on site during sewer televising.
2. The Contractor shall provide the Village with a copy of the videotape on DVD and a written report by the video contractor. The report shall include the following information:
  - a. Location and date.
  - b. Manhole numbers.
  - c. Defects, i.e.; bad joints, cracked pipe, infiltration, standing water, debris in pipe, etc.
3. All defects shall be corrected and any dirt, gravel, or foreign material removed from the sewer prior to acceptance by the Village.

H. Discharge Stenciling.

1. The following statement shall be stenciled (painted) on the gutter adjacent to all catch basins: "This Storm Sewer Drains to a \_\_\_\_\_". (Lake-Stream-Wetland-Kettle-etc.) Use white epoxy paint.
2. Stencils are available from the Village.

#### 402. STORM SEWER INLETS/OUTLETS

##### A. Inlet/Outlet Grates.

1. Install steel grating on the ends of storm sewers where shown on the Plans in accordance with the details shown on the Plans and/or in the Appendix and per the requirements of Chapter 8.16.0 of the "Standard Specifications".
2. Revise Section 8.16.1 as follows:
  - a. Delete the requirement for fastening grating to the pipe with nuts and replace with the following:

"Grating shall be prefabricated as described in Section 8.16.2."
  - b. Delete the requirement for painting and replace with the following:

"After fabrication, the entire grating shall be hot-dipped with a galvanized coating."
3. Inlet grates (trash racks) shall be placed over the pipe end section and outlet grates shall be placed approximately 3 inches from the end of the pipe unless specified otherwise on the Plans.

#### 405. STORM SEWER MATERIALS

- ##### A. Storm sewer pipe material shall be reinforced concrete sewer pipe, unless a flexible pipe is approved by the Village, conforming to the following:
1. Reinforced concrete sewer pipe (RCP) shall meet the requirements of ASTM C-76 with mortar or rubber gasket joints conforming to ASTM C-443.
    - a. RCP shall be furnished for the classes of pipe shown on the Plans.
  2. Reinforced concrete "D-Load" sewer pipe (D-Load) shall meet the requirements of ASTM C-655 with rubber gasket joints conforming to ASTM C-443. The D-Load is that load producing a 0.01 inch crack when tested in a three-edge bearing test. D-Load pipe shall have a minimum wall thickness equal to the thickness required for the "C" wall design of ASTM C-76.
    - a. D-Load pipe shall be furnished for the classes of pipe shown on the Plans.

3. Reinforced concrete horizontal elliptical sewer pipe RCHEP shall meet the requirements of ASTM C-507 with mortar or rubber gasket joints conforming to ASTM C-443.
  - a. RCHEP shall be furnished for the classes of pipe shown on the Plans.
4. High Density Polyethylene Pipe (HDPE) (with Village approval) with a corrugated exterior and smooth interior and provided with watertight bell and spigot joints with rubber gaskets. Four inch through 10 inch diameter pipes shall meet the requirements of AASHTO M-252 and 12 inch through 36 inch diameter pipes shall meet the requirements of AASHTO M-294, Type S.
  - a. HDPE pipe shall be ADS N-12 "ProLink ULTRA" as manufactured by Advanced Drainage Systems, Inc. of Columbus Ohio; or Hancor "Sure-Lok 10.8" as manufactured by Hancor, Inc. of Findlay, Ohio; or equal.
  - b. End sections used with HDPE pipe shall be reinforced concrete apron endwalls.
5. Polyvinyl chloride (PVC) (with Village approval) sewer pipe, 4 inch through 15 inch diameter, meeting the requirements of ASTM D-3034, SDR-35, with integral bell type flexible elastomeric joints meeting the requirements of ASTM D-3212. PVC material shall have a cell classification of 12454-B, 12454-C, 12364-C, or 13364-B, except that 12364-C and 13364-B shall have a minimum tensile modulus of 500,000 psi.
6. Polyvinyl chloride (PVC) (with Village approval) large diameter solid wall sewer pipe, 18 inch through 27 inch diameter, meeting the requirements of ASTM F-679, Type T-1, with a minimum pipe stiffness of 46 psi and having integral bell type flexible elastomeric joints meeting the requirements of ASTM D-3212. PVC material shall have a minimum cell classification of 12364-C or 12454-C.

B. Tracer Wire.

1. Refer to Section 635.

#### 410. STORM SEWER MANHOLES

##### A. Standard Manhole.

1. Storm sewer manholes shall be constructed in accordance with Chapter 3.5.0 and File Nos. 12, 13 and 15 of the "Standard Specifications" and these Special Provisions.
  - a. Poured Manhole Base.
    - (1) All manhole bases (benches) shall be poured in place in accordance with Subsection 3.5.5.(b) of the "Standard Specifications". Precast manhole bases or precast integral base units will be allowed, however, no precast base units with preformed benches are allowed.
  - b. Cone Dimensions.
    - (1) The top dimensions of cone sections shall be 24 inches inside diameter by 36 inches outside diameter.
2. Manholes shall be precast 48, 60, or 72 inch inside diameter, as noted on the Plans, with eccentric cones. Unless indicated otherwise on the Plans, standard manholes shall be 48 inch inside diameter.
  - a. Flat top slabs with offset openings may be used for shallow manholes where there is not sufficient depth to install cones or on deeper manholes with the approval of the Engineer.
  - b. Manhole depths shown on the Plans are approximate only, unless the cover elevation is indicated. Manhole covers shall be placed to match the existing grade or at the elevation shown on the Plans.
    - (1) Place manhole covers located in road pavements 1/4 inch below the finished grade.
  - c. Revise Chapter 6.38.0 of the "Standard Specifications" to require that concrete brick and block, if required, shall be colored "red or pink", conforming to Subsection 519.2.3 of the "State Specifications".
3. Manhole steps shall be OSHA approved, 3/8" minimum diameter steel reinforcing rod with molded plastic covering.
  - a. Manholes less than 4 feet deep do not require steps.

4. Manhole Frames and Covers.
  - a. Manhole frames and covers shall be Neenah R-1580 (old R-1080) with Type “B” lids, machined bearing surface, or equal.
  - b. Manhole frames shall be centered on the top of the cone section.
5. Adjusting Rings.
  - a. A minimum of 3 inches to a maximum of 18 inches of adjusting rings shall be furnished for each manhole. Place a maximum of 5 adjusting rings on manholes. Use thickest rings available to minimize the number of rings.
  - b. Center adjusting rings on manhole cones and center manhole castings on adjusting rings so that their surfaces will be flush whenever possible.
  - c. Dimensions.
    - (1) Adjusting rings shall be 24 inches inside diameter by 36 inches outside diameter.
    - (2) Adjusting rings shall have flat or even bearing surfaces providing bearing contact over the entire contact surfaces.
    - (3) Adjusting rings shall be as specified in Section 6.39.10 of the “Standard Specifications”, except the dimensions shall be as specified above.
  - d. Material.
    - (1) Adjusting rings shall be concrete, unless specified otherwise below, meeting the requirements of Subsection 8.39.11 of the “Standard Specifications”.
    - (2) Rubber Adjusting Rings.
      - (a) The top adjusting ring on manholes subject to traffic loadings shall be rubber as manufactured by Infra-Risers, Adaptor, Inc., or equal. Use tapered adjusting rings singly or in combination to place the manhole casting truly parallel with the plane of the pavement. Install adjusting rings in accordance with the manufacturer’s instructions using the recommended adhesive.

B. Frame/Chimney Joints.

1. Type II (Standard Manhole).

- a. All storm manholes shall be constructed with Type II frame/chimney joints unless specified otherwise on the Plans. Type II joints shall consist of the following:

- (1) Adjusting rings and manhole frames shall be set with both butyl rubber sealant and non-shrink grout (two product system) as follows. The butyl rubber sealant shall be EZ-Stik or Kent-Seal Butyl base sealant in trowelable grade or equal and applied in a 1/4 inch thick layer to the outside one-inch of the six-inch wide horizontal surface of all adjusting rings and cone section. A non-shrink grout mix in a 1/4 inch thick layer shall be applied to the remaining five inches of inside horizontal surface of all adjusting rings and cone section.

(a) Non-Shrink Grout.

- 1) Grout shall be a premixed, non-metallic; cementitious, controlled expansion, high strength, versatile non-shrink grout; PenngROUT by IPA Systems, Inc. or equal.

(b) Tuck point all internal mortar joints.

2. Sealing Manhole Chimneys.

- a. The entire outside surface of the manhole chimney, including all adjusting rings and overlapping both the manhole cone or flat-top slab (a minimum of 4 inches) and the manhole frame, shall be covered with a minimum 1/4 inch thick coating of butyl rubber sealant. The butyl rubber sealant shall be EZ-Stik or Kent-Seal butyl base sealant in trowelable grade or equal.
- b. Seal only the lower portion of the chimney, from the bottom of the external rubber seal to 4 inches below the top of the cone, on Type I frame/chimney joints (external seal) for waterproof manholes.

3. Polyethylene Wrap.

- a. A triple layer of eight (8) mil polyethylene wrap shall be applied around the manhole from the top of the frame to a minimum depth of 84 inches. The wrap shall extend at least 18 inches below the cone section. The wrap shall be applied as a bag or a sheet wrapped around the manhole in a continuous manner with seams bonded with waterproof tape.

4. Manhole Cone Inspection.

- a. All manhole cone construction work shall be inspected by the Engineer. This work includes setting rings and castings (critical), sealing chimneys, and placing polyethylene wrap.
- b. Provide at least 24 hours notice to the Engineer prior to constructing manhole cones.

C. Manhole Riser Joints.

1. Joints for precast storm manhole riser sections shall be made with rubber "O"-ring gaskets, a continuous ring of butyl rubber sealant (EZ-Stik or Kent-Seal in rope form) or equal. The butyl sealant shall be 1 inch diameter equivalent or as recommended by the manhole manufacturer.

D. Sewer Stubs.

1. Sewer stubs shall be one full length of pipe or 4 foot minimum length and shall be bulkheaded in accordance with Section 3.2.25(a) of the "Standard Specifications".

E. Manhole/Pipe Connections.

1. Connections of pipes to manholes shall be made in accordance with Section 3.5.7 of the "Standard Specifications", as modified below. All field tapped holes for connecting sewer pipe to manholes shall be made by coring.
  - a. Rigid Pipe. Reinforced concrete pipe shall be connected by means of brick and mortar per Subsection 3.5.7(a)1.b.
  - b. Flexible Pipe. Corrugated polyethylene pipe (HDPE) and polyvinyl chloride pipe (PVC) shall be connected by either an approved flexible pipe to manhole seal or by means of brick and mortar per Subsection 3.5.7(b). Install a rubber gasket around the

pipe, centered on the manhole wall, when forming mortared connections.

F. Asphaltic Pavement Placement.

1. Where asphaltic pavement is placed around manhole rims, the top of manhole castings shall be set 1/4 inch below the finished asphaltic grade.
  - a. If only the binder course of asphaltic pavement is being placed in the first year, then all manhole rims shall be surrounded by an asphaltic pavement wedge that is a minimum of 3 feet wide. This asphaltic wedge shall be placed within 24 hours of the placement of the binder course.
  - b. Asphaltic wedges shall be removed prior to placement of the asphaltic surface course.

415. CATCH BASINS

A. Standard Catch Basin.

1. Catch basins shall be constructed in accordance with the standard catch basin details shown on the Plans and/or in the Appendix to these Special Provisions and these Special Provisions.
  - a. Catch basins shall be either precast or constructed of 6 inch concrete block.
    - (1) Revise Chapter 6.38.0 of the "Standard Specifications" to require that concrete brick and block shall be colored "red or pink", conforming to Subsection 519.2.3 of the "State Specifications".
  - b. The depths of catch basins shown on the Plans are measured from the invert of the lead to the flow line of the grate and do not include the sump depth. Catch basin grates shall be placed to match the ditch or gutter grade or at the elevation indicated on the Plans.
2. Sumps.
  - a. Catch basins connected to storm sewer lines discharging directly to a lake or stream shall be provided with 12 inch deep sumps.
  - b. Catch basins connected to storm sewer lines discharging to kettles or wetlands shall not have sumps.

3. Setting Rings and Frames.

- a. Adjusting rings and catch basin frames shall be set with both butyl rubber sealant and non-shrink grout (two product system) as follows. The butyl rubber sealant shall be EZ-Stik or Kent-Seal butyl base sealant in trowelable grade or equal and applied in a 1/4 inch thick layer to the outside one-inch of the horizontal surface of all adjusting rings and top of precast or block structure. A non-shrink grout mix in a 1/4 inch thick layer shall be applied to the remaining inside horizontal surface of all adjusting rings and top of precast or block structure.

- (1) Non-Shrink Grout.

- a) Grout shall be a premixed, non-metallic; cementitious controlled expansion, high strength, versatile non-shrink grout; PenngROUT by IPA Systems, Inc. or equal.

- (2) Tuck point all internal mortar joints.

4. Waterproofing.

- a. Sealing External Surfaces.

- (1) The entire outside surface of the top of the catch basin, including all adjusting rings and overlapping both the catch basin structure or flat-top slab (a minimum of 4 inches) and the catch basin frame, shall be covered with a minimum 1/4 inch thick coating of butyl rubber sealant. The butyl rubber sealant shall be EZ-Stik or Kent-Seal butyl base sealant in trowelable grade or equal.

- (2) Seal the remaining outside surface of block catch basins with a one-half inch thick mortar backplaster or a 1/4 inch thick coating of butyl rubber sealant.

- b. Polyethylene Wrap.

- (1) A triple layer of eight (8) mil polyethylene wrap shall be applied around the catch basins from the top of the frame to a minimum depth of 36 inches. The wrap shall be applied as a bag or a sheet wrapped around the catch basin in a continuous manner with seams bonded with waterproof tape.

B. Catch Basin/Pipe Connections.

1. Connections of rigid pipes to catch basins shall be made with brick and mortar in accordance with Subsection 3.5.7(a)1.b. of the "Standard Specifications".
2. Connections of flexible pipes (HDPE or PVC) to catch basins shall be made with brick and mortar in accordance with Subsection 3.5.7(b) of the "Standard Specifications". Place a rubber gasket around the pipe centered on the catch basin wall.

430. RIPRAP

A. Riprap shall comply with Section 606 of the "State Specifications", as modified below.

B. Materials.

1. Riprap shall comply with Subsection 606.2 except that concrete slabs may not be substituted for stone. Riprap dimensions shall be as specified in Subsection 606.2(2) and will be to the approximate sizes and thicknesses listed below.

<u>Type</u>	<u>Stone Sizes (Inches)</u>	<u>Thickness (Inches)</u>
Light Riprap	4 to 16	12
Medium Riprap	5 to 20	18
Heavy Riprap	6.5 to 25	24
Extra-Heavy Riprap	8 to 30	30

C. Placing Riprap.

1. Light Riprap.
  - a. Place by hand with larger stones in lower courses. Lay stones perpendicular to the slope with close, broken joints, firmly bed in the slope, and thoroughly compact. Chink spaces between stones to make the finished surface even and tight.

2. Medium, Heavy, and Extra-Heavy Riprap.

- b. May be placed by mechanical means, not dumping, that produces work within reasonable tolerances of the typical section(s). Fill voids with smaller pieces.

D. Geotextile Fabric.

- 1. Riprap shall be placed on a layer of geotextile fabric as indicated on the Plans or as directed by the Engineer.
- 2. Place the fabric in accordance with Subsections 645.3.6 and 645.3.7 of the "State Specifications".
- 3. Material.
  - a. Light Riprap.
    - (1) The fabric shall be Geotextile Fabric, Type R (Riprap) meeting the minimum values specified in Subsection 645.2.6.
  - b. Medium, Heavy, and Extra Heavy Riprap.
    - (1) The fabric shall be Geotextile Fabric, Type HR (Heavy Riprap) meeting the minimum values specified in Subsection 645.2.7.

501. WATER MAIN CONSTRUCTION

A. Bedding and Cover Material.

- 1. Ductile Iron Pipe.
  - a. Bedding and cover material used with unwrapped ductile iron water main shall be sand, crushed stone chips or crushed stone screenings conforming to Section 6.43.2 of the "Standard Specifications".
    - (1) If polyethylene wrap is ordered installed, due to poor soils, the bedding and cover material shall be bedding sand conforming to Subsection 6.43.2 (c).
    - (2) Crushed stone chips bedding and cover material used for 18" diameter or smaller pipes shall conform to either Table 32 (3/8" crushed stone chips containing at least 85%

machine fractured particles) or Table 33 (3/4" crushed stone chips containing at least 65% machine fractured particles) of Section 6.43.2 (a).

2. Polyvinyl Chloride (PVC) Pipe.

- a. Bedding and cover material shall conform to either Table 32 (3/8" crushed stone chips containing at least 85% machine fractured particles) or Table 33 (3/4" crushed stone chips containing at least 65% machine fractured particles) of Section 6.43.2 (a) of the "Standard Specifications". Crushed pea gravel will not be allowed for use as bedding or cover material.

3. Trench Section.

- a. The trench section shall conform with Section 4.3.3 and File No. 36 of the "Standard Specifications", as amended below:
  - (1) Bedding and cover shall be placed in a minimum of three separate lifts to ensure adequate compaction of these materials, with one lift of bedding material ending at or near the springline of the pipe. The Contractor shall take care to completely work bedding material under the haunch of the pipe to provide adequate side support.
  - (2) Amend Section 4.3.3 and File No. 36 of the "Standard Specifications" to require a minimum of 12 inches of cover material over the top of the pipe.

B. Delete Polyethylene Wrap.

- 1. Delete Section 4.4.4 and all references to polyethylene wrap from the "Standard Specifications". Polyethylene wrap is not required.
- 2. Water mains installed within organic soil layers, former landfill areas or crossing cathodically protected pipe lines shall be wrapped as ordered by the Village.
  - a. Polyethylene wrap, if required, shall meet the requirements of AWWA Standard C-105 (ANSI A21.5) using Class C (black) polyethylene material and shall be installed as specified in Section 4.4.4 of the "Standard Specifications".

C. Disinfecting Water Mains.

1. Water mains shall be cleaned and disinfected in accordance with Sections 4.3.11 and 4.3.12 and Chapter 4.16.0 of the "Standard Specifications" and AWWA Standard C651. Place calcium hypochlorite tablets in the water main as specified in Section 4.3.12.
2. See Section 555 of these Special Provisions for water main flushing and sampling requirements.

D. Sewer Crossings.

1. Center one full length of water main pipe on sewers wherever water main crosses over or under a sanitary or storm sewer so that both water main joints will be as far from the sewer as possible.

E. High Points in Water Main.

1. The Contractor shall install water main at the grades shown on the Plans with no high points constructed in the main except at hydrants and as indicated on the Plans. If a high point which could trap air can not be prevented, then an air release assembly shall be constructed at that point, if so ordered by the Village.
  - a. The Village reserves the right to order the Contractor to relay water main placed at the wrong grade. The cost of such relay work shall be paid for by the Contractor.

F. Joint Restraint.

1. Restraining Fittings, Valves and Sleeves.
  - a. MEGALUG Restrained Joints.
    - (1) Restrain all fittings (bends, tees, caps and plugs), valves and sleeves using MEGALUG restrained joints as manufactured by EBAA Iron Sales, Inc. of Eastland, Texas, or as provided for in Paragraph b. below.
    - (2) Buttress all fittings, as provided for in Paragraph G.1 below, in addition to joint restraint.
  - b. Joint Restraint Systems.
    - (1) The following joint restraint systems may be used in place of MEGALUG restrained joints.

(a) Tyler Mechanical Joint Restraint.

- 1) Joint restraint for mechanical joint pipe and fittings used with either ductile iron or PVC pipe may be provided using the Tyler Mechanical Joint Restraint (MJR) System on 4 inch through 12 inch diameter pipes.

(b) Restrained Joint Pipe.

- 1) Joint restraint for push-on joint pipe may be provided by using U.S. Pipe TR FLEX restrained joint pipe, Clow Super-Lock Joint pipe, Griffin Snap-Lok restrained joint pipe, American Flex-Ring or Lok-Ring restrained joint pipe or equal.

2. Restraining Vertical Bends and Offsets.

- a. Changes in the grade of the water main made by vertical bends or offsets shall be restrained by strapping in accordance with File No. 47 of the "Standard Specifications" or as provided for in Subsection F.1 above.

3. Restrained Joint Pipe Sections.

- a. All water main pipe and fittings, within sections shown on the Plans as "Joint Restraint" or "Restrained", shall be restrained as specified in Subsection F. above and fittings shall be buttressed as specified in Subsection G. below.
- b. Restrained Joints in Casings.
  - (1) The joints of restrained joint pipe installed in casings shall be fully extended to take up the joint slack prior to making the end connections.

4. Restrain Valves on PVC Pipe in Valve Manholes.

- a. All valves placed in valve manholes and installed on PVC pipe shall be restrained using PVC joint restraint systems as manufactured by EBAA Iron Sales, Inc.

5. Restrained Joint Water Services.

- a. All 4 inch and larger water service piping shall be restrained from the main line tee to the shut-off valve, as specified in Subsection F.1 above, with the end of the service piping braced with thrust blocking. In lieu of providing thrust blocking, the Contractor may restrain the entire length of service piping.
- b. Restrain one full length of main on both sides of the tee wherever the total length of restrained water service pipe is less than the minimum restrained lengths shown below.

<u>Water Service Size</u>	<u>Minimum Restrained Length</u>
4"	30 feet
6"	40 feet
8"	60 feet
10"	70 feet
12"	80 feet
16"	100 feet

6. Restrained Hydrant Leads.

- a. Hydrant leads shall be restrained in accordance with Subsection 530.D. of these "Special Provisions".

G. Concrete Blocking (Buttresses).

1. All horizontal bends, tees, caps and plugs shall be provided with concrete buttresses, in addition to joint restraint as specified in Paragraph F.1.a(1) above, in accordance with Section 4.3.13 and File Nos. 44, 44A, 45 and 46 of the "Standard Specifications".

H. Insulation.

1. Water mains shall be insulated where noted on the Plans and wherever the depth of cover is less than five (5) feet when so ordered by the Village. Insulation shall be in accordance with Chapter 4.17.0. of the "Standard Specifications" and the details in the Appendix.

I. Existing Valves.

1. Locate.
  - a. Prior to beginning construction, the Contractor shall assist the Village in locating all pertinent water main valves and ensure that they are in good working condition.

2. Operation.

- a. All existing valves will be operated by or under the supervision of the Village Water Department, contact Mr. Tom Rossmiller, Superintendent, at 642-6253.

J. Connections to Existing Mains.

- 1. The Contractor shall coordinate his work schedule with the Village when connecting intersecting streets to the new water main in order to minimize inconvenience and disruption caused by the temporary discontinuance of water service. The Contractor shall notify the Village at least 72 hours prior to shutting off any water service. Water service to residences shall not be shut down for a period longer than eight (8) hours, nor after 4:30 p.m. or on weekends without approval of the Village. Residential water service may only be shut down between the hours of 8:30 a.m. to 4:30 p.m., except that residential water services may be shut down outside of these hours with the Village's permission. Water service to businesses shall not be shut down for a period longer than two (2) hours unless satisfactory arrangements are made with the businesses affected. The Contractor shall take whatever measures are necessary to return service at the end of each working day, including the use of temporary valves or plugs.
- 2. The Contractor shall personally notify all water users of any interruption in water service through both verbal and written (door-to-door) contact at least 24 hours prior to shutting off any water service.

K. Water Main Offsets.

- 1. Water mains shall be offset as shown on the Plans or as directed by the Village. Water main offsets shall be in accordance with File No. 47 of the "Standard Specifications" as modified below.
  - a. Place offsets to provide a minimum of six (6) feet of cover.
    - (1) Water main shall be offset down only (under the conflicting utility) to prevent high points being created in the offset.
  - b. Offset castings may be used when the change in grade is 24 inches or less.
  - c. Concrete buttresses shall be constructed as shown, however, optional restraining methods as specified in the section on Joint Restraint of this article may be used in lieu of strapping.

## 502. ABANDONING WATER MAINS AND SERVICES

### A. Abandoning Water Mains.

1. The Contractor shall abandon water mains and all intersecting mains within the street right-of-way as shown on the Plans and as directed by the Engineer. Mains shall be abandoned to an existing tee or cross in live mains or as shown on the Plans.
2. Abandoned mains may be left in place except that abandoned mains within new water main trenches shall be removed and disposed of by the Contractor. All cut ends of abandoned mains left in place shall be plugged with a minimum 6 inch thick concrete bulkhead.
3. Live tees, crosses and mains shall be secured with mechanical joint plugs and buttresses.

### B. Abandoning Valves, Valve Boxes and Valve Manholes.

1. The procedure for abandoning valves, including hydrant valves and curb stops, valve boxes and valve manholes shall be as specified below:
  - a. Abandoned valves shall be closed and left in place unless it is stated on the Plans to remove and salvage the valve(s) for the Village.
  - b. Valve boxes shall be abandoned by removing the cover and top section(s) to a depth of 3 feet below the street grade. Backfill remaining valve box sections and the excavation with 3/8 inch crushed stone chips (bedding material) thoroughly compacted in 12 inch maximum lifts.
  - c. Valve manholes shall be abandoned by removing the casting and manhole sections to a depth of 3 feet below the street grade. Manhole frames and covers shall be salvaged for the Village. Cut a 6 inch diameter hole in the bottom of manholes to provide drainage. Backfill remaining manhole sections and the excavation with granular backfill thoroughly compacted in 12 inch maximum lifts.
2. Valves, valve boxes and valve manholes within new water main trenches shall be removed and disposed of by the Contractor except that all salvageable valves, valve boxes and manhole castings shall remain the property of the Village. The Contractor shall deliver salvageable materials to a location designated by the Village.

C. Abandoning Hydrants.

1. The Contractor shall remove and salvage all hydrants shown on the Plans to be abandoned, removed or replaced. Abandoned hydrants shall be delivered to a location designated by the Village.
2. Hydrant valves and valve boxes adjacent to hydrants shall be removed and salvaged for the Village.

D. Hydrant Relocation.

1. The Contractor shall remove existing hydrants and install them at the locations shown on the Plans. Existing hydrant leads and valves shall be abandoned in accordance with Subsections 502.A. and 502.B. above.
2. The Contractor shall allow the Village Water Department to inspect and repair, if necessary, salvaged hydrants prior to their being installed at the new hydrant locations. The Village will furnish new hydrants to be installed if repair of existing hydrants will unduly interfere with the Contractor's work operations.
3. The Contractor shall furnish and install hydrant barrel extensions on salvaged hydrants as required in accordance with Subsection 530.B. of these Special Provisions.

E. Connections to Intersecting Mains.

1. The Contractor shall remove and replace sections of intersecting water mains at street intersections and at other locations as shown on the Plans and as directed by the Engineer. New intersecting mains shall be placed at the grades shown on the Plans or at the elevation of the existing main if no grade is shown. Install the intersecting main at a constant grade with no intermediate high points which could trap air. Do not connect intersecting mains until after the main line has been tested and approved unless otherwise allowed in these Special Provisions by the Engineer.
2. Trapped air in intersecting mains shall be bled off (by tapping the main) when filling the main with water and/or removed through hydrants when flushing intersecting mains.
3. It is not necessary to pressure test intersecting mains, however, the intersecting mains shall be subjected to line pressure and any visible defects repaired prior to backfilling.

4. Intersecting mains shall be thoroughly flushed through the nearest hydrant(s) prior to or when placing in service. See Paragraph 555.C. of these Special Provisions for water main disinfection requirements.

F. Replacing and Abandoning Water Services.

1. The Contractor shall replace all existing lead and galvanized water services, including replacing lead and galvanized water service piping from the new mains to curb valves and replacing existing curb valves and boxes. The Contractor is responsible for insuring that all live water services, plus water services to vacant lots, are reconnected. Existing services are of varying size (1/2 inch to 1 inch) and material including copper (Cu), lead (Pb) and galvanized iron. The Contractor shall furnish and install all adaptors, reducers, etc. required to connect to existing services on the house side of the new curb valve.
  - a. Place new curb valves at the same location as existing curb valves except place new curb valves a minimum of 5 feet behind the curb.
  - b. Install water service piping to provide a minimum of 6-1/2 feet of cover. New water service piping crossing existing water mains shall be placed at least 6 inches below the existing main.
  - c. Crimp the ends of all abandoned water service piping left in place.
  - d. See Section 540 of these Special Provisions for additional water service requirements.
2. Abandoned water service piping located in the new water service trench and abandoned curb valves and valve boxes shall be removed and disposed of by the Contractor except that salvageable curb valves and valve boxes shall remain the property of the Village.

G. Connecting Existing Copper Water Services.

1. The Contractor shall connect all existing copper water services to the new main. Existing copper services may be of varying size (1/2 inch to 1 inch). Installation of water services shall comply with the provisions of Subsection 502.F. above.
2. The unit price bid for connecting existing copper water service piping to the new main shall include, but not be limited to, furnishing and installing corporation stop, fittings and up to five (5) feet of copper tubing. If greater than 5 feet of tubing is required, the additional length will be paid for at the price(s) bid for water service piping.

## 505. WATER MAIN MATERIALS

- A. Water main pipe material shall be ductile iron or polyvinyl chloride conforming to the following:

### 505.1. DUCTILE IRON PIPE

- A. Ductile iron pipe meeting the requirements of AWWA Standard C-151 (ANSI 21.51), cement mortar lined with internal and external bituminous coating and furnished with either push-on or mechanical joints with rubber gaskets. Do not furnish cable bonding or other methods of providing electrical conductivity.
  - 1. Ductile iron pipe shall be furnished for the following minimum thickness classes:
    - a. Six (6) inch hydrant lead, 8 inch and 10 inch pipe shall be Class 52.
    - b. Twelve (12) inch pipe shall be Class 51.

### 505.2. POLYVINYL CHLORIDE PIPE

- A. Polyvinyl Chloride (PVC) pipe (4" through 12" diameter) meeting the requirements of AWWA Standard C-900, Class 150, DR-18, with cast iron O.D. and integral elastomeric bell and spigot joints.
  - 1. Hydrant leads shall be ductile iron pipe.

### 505.3. FITTINGS (USED WITH DUCTILE IRON AND PVC PIPE)

- A. Fittings shall be ductile iron or cast iron, cement mortar lined with internal and external bituminous coating and meeting the requirements of AWWA Standard C-110 (ANSI 21.10). Fittings shall be supplied with mechanical joints with rubber gaskets.
  - 1. Ductile iron mechanical joint fittings meeting the requirements of AWWA Standard C-153 for "compact fittings", 3" through 16" size, may be used in place of the fittings specified above.
  - 2. All fittings shall be North American-made only.
- B. Bolts.
  - 1. All water main nuts and bolts, including connections to mains, fittings, valves and hydrants, shall be Cor-Blue T-Bolts as manufactured by NSS Industries or equal.

#### 505.4. TRACER WIRE

- A. Refer to Section 635.

#### 510. VALVES AND VALVE BOXES

- A. Gate Valves and Resilient-Seated Gate Valves.

1. Gate valves shall be AWWA gate valves meeting the requirements of AWWA C-500.
  - a. Gate valves shall be furnished with mechanical joints with rubber gaskets, cast iron body, bronze mounted, double disc, parallel seat, non-rising stem, "O"-ring packing, 2 inch square operating nut opening to the left (counterclockwise) and rated at 200 psi working pressure.
  - b. Gate valves shall be Smith "Metropolitan" or Dresser "M&H Metropolitan".
2. Resilient-seated gate valves shall meet the requirements of AWWA C-509.
  - a. Resilient-seated gate valves shall be furnished with mechanical joints with rubber gaskets, cast iron or ductile iron body, bronze mounted, resilient wedge, non-rising stem, "O"-ring stem seals, 2 inch square operating nut opening to the left (counterclockwise) and rated at 200 psi working pressure.
  - b. Resilient-seated gate valves shall be AFC "Series 500", or Mueller A-2370 with mechanical joint or push-on ends.
3. All 4 inch through 10 inch valves shall be gate valves or resilient-seated gate valves unless shown otherwise on the Plans.

- B. Butterfly Valves.

1. Butterfly valves shall be AWWA rubber-seated butterfly valves meeting the requirements of AWWA C-504, Class 150B.
  - a. Butterfly valves shall be furnished with mechanical rubber gasket joints, cast iron body for buried service, underground operator with a 2 inch square operating nut opening to the left (counterclockwise) and rated at 150 psi working pressure.

- b. All 12 inch valves shall be butterfly valves.
- c. Butterfly valves shall be Dresser M&H "Style 450", Pratt "Groundhog", or Mueller "Linesal III", B-3211 with mechanical joint ends.

C. Valve Boxes.

- 1. Valve boxes shall be three piece cast iron valve boxes consisting of base, screw type center (5-1/4 inch shaft diameter) and top section with cover marked "WATER", Extension sections shall be furnished as required. Valve boxes shall be furnished for the depth of trench shown on the Plans with the cover placed at the existing grade or to the elevation shown on the Plans.
  - a. Valve boxes shall be Tyler 6860 series except for 6-inch valves, or a North-American made equal as approved by the Village.
  - b. Valve boxes for 6-inch valves shall be Tyler 664-S or a North-American made equal as approved by the Village.
- 2. Valve Box Adaptors.
  - a. Valve boxes for both gate and butterfly valves shall be installed by mounting on valve box adaptors as manufactured by Adaptor, Inc., of Oak Creek, Wisconsin, or equal.
- 3. Valve Stem Extensions.
  - a. All valves installed at greater than 8 feet of depth shall be provided with valve stem extensions to bring the operating nut up to normal depth (equivalent to a valve at 8 feet of depth). The extension shall be secured to the operating nut with at least 2 set screws drilled into the nut. Provide a centering ring at the top of the extension.

D. Asphaltic Pavement Placement.

- 1. Where asphaltic pavement is placed around valve boxes, the top of the valve box shall be set 1/4 inch below the finished asphaltic grade.
  - a. If only the binder course of asphaltic pavement is being placed in the first year, then all valve boxes shall be surrounded by an asphaltic pavement wedge that is a minimum of 3 feet wide. This asphaltic wedge shall be placed within 24 hours of the placement of the binder course.

- (1) Optional - Turn the valve down, but provide adequate thread to turn the valve to final grade.

- b. Asphaltic wedges shall be removed prior to placement of the asphaltic surface course.

E. Tapping Valves and Sleeves.

1. Tapping valves shall be similar to the AWWA gate valves specified in Subsection 510.A of these Special Provisions except for the end connection (usually flanged) to the tapping sleeve and oversized seat rings to permit entry of the tapping machine cutters.
2. Tapping sleeves shall be supplied by the manufacturer of the tapping valves.

F. Cutting-In Valves and Sleeves.

1. Cutting-in valves shall be similar to the AWWA gate valves specified in Subsection 510.A of these Special Provisions except that they shall be provided with special gaskets allowing assembly on various types of pipe.
2. Cutting-in sleeves shall be supplied by the manufacturer of the cutting-in valves.

515. AIR-RELEASE ASSEMBLIES

- A. Air-release assemblies shall be constructed in accordance with File No. 42 or File No. 43 (for dead end mains) of the "Standard Specifications". Copper tubing shall be 1 inch diameter for 16 inch diameter water main or smaller and 2 inch diameter for 18 inch water main and larger.

530. HYDRANTS

A. Standard Hydrant.

1. Hydrants shall be Mueller "Super Centurion 250", Model A-423, conforming to the following specifications:
  - a. Hydrants shall be compression type, with 5-1/4 inch bottom valve and 6 inch mechanical joint inlet connection, "O"-ring packing, safety flange construction, meeting the requirements of AWWA Standard C502 and meeting specifications for 300 PSI test pressure and 150 PSI working pressure.

- b. Hydrants shall have two 2-1/2 inch hose nozzles with National Standard fire hose coupling screw threads and nut type nozzle caps with gaskets and chains and one 4-1/2 inch pumper nozzle with STORZ-LOK 125 quick-connect fitting.
- c. Hydrants shall have 1-1/2 inch pentagon operating nut opening to the left (counter-clockwise).
- d. Hydrants, including barrel extensions, shall be painted the colors listed below as determined by their connection to the corresponding sizes of water main pipe. The finish coat shall have an epoxy finish.

Water Main Size	Color of Hydrant
4 Inch	Red
6 Inch	Yellow
8 Inch	Medium Blue
10 to 12 Inch	Medium Green

B. Barrel Extensions.

1. Hydrants shall be furnished for the depth of bury shown on the Plans. Hydrants requiring greater than 7-1/2 feet of bury shall be furnished as standard 7-1/2 foot hydrants with extensions as required. Hydrant extensions shall be compatible with hydrant barrel and stem sections and shall be installed at the top of the barrel section. The distance from the ground line to the centerline of the lowest nozzle shall be 18 inches. Hydrants shall be buried to the bury mark.

C. Valve and Valve Box.

1. Hydrant valves and valve boxes shall conform to the requirements for gate valves and valve boxes of these Special Provisions.
  - a. The valve box shall be a Tyler 664-S with no welded-on threads.
2. The valve box shall be located 3 feet from the hydrant.

D. Hydrant Leads.

1. Hydrant leads shall be six (6) inch, Class 52, ductile iron pipe.
2. Restrain hydrants with thrust blocking and by anchoring to the main. Restrain all joints with: tie rods (2-3/4" diameter) per File No. 47 of the "Standard Specifications", retainer glands, MEGALUG restrained joints, anchoring pipe and fittings, or restrained joint pipe; per Subsection 501.F

of these “Special Provisions”. Provide solid concrete thrust blocks for both the hydrant and hydrant tee.

E. Temporary Hydrant Cover. (Use Outside of New Subdivisions.)

1. Temporarily cover new hydrants (except for hydrants located in new subdivisions) during construction with polyethylene bags, securely fastened in place, until after the water main has been tested and placed in service.

540. WATER SERVICES

A. Installation.

1. Water service piping shall be installed in accordance with Chapter 5.5.0 of the “Standard Specifications” and the following provisions:
  - a. Amend Section 5.5.8 of the “Standard Specifications” to require the Contractor to install corporation stops.
  - b. Do not connect services to the water main until after the main has been tested and a safe water sample obtained.
  - c. Insert the corporation stop into the water main while the main is in service and under pressure.
  - d. Don’t backfill the water service trench until after the service has been checked for leaks and the service piping thoroughly flushed.
2. Cover.
  - a. Install water service piping with 6 feet minimum cover.
  - b. Insulate the water service where 6 feet of cover cannot be provided. Install insulation on top and sides of piping per details in the Appendix.
3. Tapping PVC Water Main.
  - a. PVC water main shall be tapped using double strap service clamps. Corporation stops installed on PVC pipe shall be furnished with AWWA tapered threads conforming to AWWA C-800.
    - (1) Service clamps shall have the following minimum total widths:

- (a) 3/4" and 1" services - 2" minimum width.
  - (b) 1-1/4", 1-1/2" and 2" services - 3" minimum width.
- b. Taps shall be located at least 2 feet from the ends of pipe sections and at least 18 inches apart measured in a horizontal direction.
- c. Tap PVC pipe using a shell cutter with internal teeth. Do not use a standard drill and tap for direct tapping under pressure.
- d. Place teflon tape on corporation stop threads prior to installation. Corporation stops shall be torqued to a maximum of 35 ft.-lb. or as recommended by the manufacturer.

B. Water Service Piping.

1. Copper Tubing.

- a. Water service piping from the main to the curb valve, for 3/4", 1", 1-1/2", and 2" services, shall be Type "K" soft annealed seamless copper water tube conforming to the specifications of ASTM Designation B-88.

- (1) Install 1" minimum water services.

2. Plastic Pipe.

- a. Plastic water pipe may be installed beyond the curb valve, however, all tubing from the main to the curb valve shall be copper.

- (1) Install compression curb valves where it is known that polyethylene pipe will be installed beyond the curb valve.

- b. The Village will not thaw out frozen plastic water lines.

C. Water Services Materials.

- 1. Water services shall include corporation stop, service clamps if required, curb valve, valve box and stationary rod as specified herein and as shown on the Plans.

- a. Corporation stops (3/4" through 1" size) shall be Mueller H-15000 (flare-type) or H-15008 (compression type). All 1-1/2" and 2" stops shall be Mueller H-15013 (compression type) installed using

stainless steel double strap service clamp with epoxy-coated ductile iron saddle.

(1) Install all stops on the PVC pipe with stainless steel double strap service clamps with epoxy coated ductile iron saddle.

b. Curb valves shall be Mueller Mark II Oriseal valves, Minneapolis pattern, H-15154 (flare-type); or H-15155 (compression-type) for 3/4" and 1"; and Mueller ball curb valves, Minneapolis pattern, B-25154 (flare-type) or B-25155 (compression-type) for 1-1/2" and 2".

c. Curb boxes shall be extension type with Minneapolis pattern base, Mueller H-10387 for 3/4"; H-10388 for 1"; and H-10302 for 1-1/2" and 2".

(1) Curb boxes shall be furnished with stationary rod for 6 feet of bury.

D. Curb Valve Location.

1. Curb valves shall be placed five (5) feet from the back of curb, unless shown otherwise on the Plans, with the water service piping extending to the street right-of-way line and the end of the tubing pinched shut.
2. Place water services at the center of vacant lots and/or outside of existing or future driveways.

E. Augering Service Piping (Existing Roadways).

1. Water service piping shall be installed by augering under existing pavement and shoulder areas.

F. Abandoning Water Services.

1. The following procedure shall be used when abandoning water services.
  - a. Shut corporation stop.
  - b. Remove water service pipe from stop and cap or plug corporation stop. Pinch end of abandoned service pipe.
  - c. Shut curb valve, remove top 3 feet of valve box and fill remaining box with sand.

G. Water Meters.

1. Water meters shall be located in a secure room accessible only to the building owner and Village personnel.
2. The meter shall be installed with ball valves on both sides. Commercial and industrial meters shall be provided with a valved bypass line. The bypass line shall be locked shut with the key only accessible to Village personnel.
3. Set meters a minimum height off the floor equal to twice the length of the meter.
4. Water meters will be furnished by the Village.

550. HYDROSTATIC TESTS

A. General Requirements.

1. All tests shall be performed as specified in Chapter 4.15.0 of the "Standard Specifications", except that the water main shall pass three consecutive one-hour leakage tests. The Village or its Representative shall be present at all times during testing.
2. The Contractor shall furnish all labor, equipment and material to complete all testing.
3. Temporary Air-Release.
  - a. Trapped air shall be bled off (by tapping the main) when filling the main with water and/or removed by flushing through hydrants.
  - b. Temporary air-release may be provided by tapping 1 inch corporation stops into the high points of pipe or into the plug on dead end lines. After flushing and testing is completed, the temporary taps shall be abandoned in place.
  - c. The Contractor shall provide temporary flushing hydrants if required to flush dead end lines.

B. Test Sections.

1. The Contractor may test the entire new water main as one continuous test section or shall test in segments if so directed by the Village.

## 555. DISINFECTION

### A. General Requirements.

1. The water main shall be disinfected in accordance with Section 4.3.12 and Chapter 4.16.0 of the "Standard Specifications".

- a. Amend paragraph 4.16.5 of the "Standard Specifications" to read:

4.16.5 SAMPLING. The Contractor shall take all necessary samples of the water and provide any equipment necessary to take these samples. The Contractor, accompanied by the Village or its representative, shall deliver the samples to an approved laboratory for testing.

### B. Safe Samples.

1. At least one (1) safe sample must be obtained from each of the segments hydrostatically tested as listed under Subsection 550.B (Test Sections) of these Special Provisions. If the initial test fails, then two (2) subsequent safe samples shall be obtained for the failing segment. These samples shall be taken from two different locations (or flowing from two different directions to the same point) and at two separate times (at least 24 hours apart). Additional samples may also be required from:
  - a. Representative locations from each of the test sections to establish that all of the mains are free of contamination.
  - b. Dead end lines.
  - c. Connections to existing mains (see Subsection 555.C of these Special Provisions).
2. Water main segment(s) shall not be placed in service until after safe water sample(s) have been obtained. Safe water sample reports must be provided to the DPW before the main may be put in service.

### C. Procedures for Disinfecting Connections to Existing Mains.

The following procedures apply when existing mains are wholly or partially dewatered. Existing mains that are isolated by an existing valve require no disinfection. After the appropriate procedures have been completed, the existing main may be returned to service prior to completion of bacteriological testing to minimize disruption to service.

1. Apply liberal quantities of hypochlorite to wet trenches at or near the connection to the existing main. Use hypochlorite tablets if water is being pumped from the trench to prolong protection as hypochlorite is slowly released as the tablets dissolve.
2. Swab the interior of all pipe and fittings located between the connection to the existing main and the closest new valve (including connection pipe and fittings) with a one percent hypochlorite solution in accordance with Subsection 555.F of these Special Provisions.
3. Flush the connection to the existing main, from both directions toward the connection if valve and locations permit, as soon as the connection has been completed and the nearest new valve installed and secured. Flush through the new main until all discolored water is eliminated.
4. Should the water main connection be severely contaminated by dirty water or other means, the existing main and connection shall be disinfected by slug chlorination in accordance with the procedure specified below:
  - a. Continue to isolate the section of contaminated main.
  - b. Shut off all service connections.
  - c. Place hypochlorite tablets in the connection to the new main.
  - d. Flush the main to remove particulates.
  - e. Slowly dose the contaminated main with a 300 mg/l free chlorine concentration for a period of at least 15 minutes.
  - f. Flush the main until the water is free of noticeable chlorine odor.
  - g. Open service connections and return the main to service.
5. Take bacteriological samples to provide a record for determining the effectiveness of the procedure. Samples may be required from both sides of the connection.

If unsatisfactory tests are recorded, the Village will determine the necessary corrective action. Take daily samples until two consecutive safe samples have been recorded.

D.     Rechlorination.

1.     Should any test prove unsatisfactory, the water main shall be sterilized by the Contractor by such methods as he deems necessary and samples taken until acceptable results are obtained.

E.     Flushing.

1.     All water mains, including dead end mains and all hydrants, and all water services shall be flushed. Water services shall be flushed, with a minimum amount of water equivalent to the volume of the service pipe, until the water is visibly clean.
  - a.     The Contractor shall discharge all chlorinated, or chemically treated, or contaminated (e.g. oils, grease) flushing water to the Village sanitary sewer system. The Contractor shall supply his own flexible hose. The Contractor shall notify the Village prior to discharging to the Village sanitary sewer system. All other flushing water shall be discharged to a grassed area. The water shall not be discharged to a surface water or Village storm sewer system. The Contractor shall monitor the flow quantities for discharges and shall report these quantities to the Village.
  - b.     The Contractor shall provide temporary flushing hydrants as required, including all intermediate high points in the water main.
2.     Water Furnished By Village.
  - a.     Water for testing and flushing of public water mains will be furnished by the Village. The Contractor shall notify the Village prior to commencing flushing and shall coordinate his operations with the Village in order not to deplete the water supply. Water usage may be restricted to nighttime or weekend hours during periods of high demand. All flushing of new mains and services shall be done under the direct supervision of the Village or its representative.
  - b.     Water for testing and flushing of private water mains will be furnished by the Village but paid for by the Developer.
  - c.     All discharged water must be metered and accounted for.

F.     Swabbing Water Main.

1.     All piping installed outside of water main test segments shall be disinfected by swabbing with a 1% hypochlorite solution and thoroughly

flushed. The entire interior surfaces of all pipes and fittings shall be thoroughly swabbed. The diameter of swabs used in pipes shall match the interior pipe diameter and provide resistance when swabbing the pipes. Pipes shall be swabbed with a pumping motion with all surfaces wiped several times. The Contractor shall use extreme care to ensure the cleanliness of all water main materials used.

600. GENERAL CONSTRUCTION PROCEDURES

604. COLD WEATHER WORK

A. Asphaltic Paving.

1. Asphaltic pavement shall not be placed when the air temperature is below 35°F.
2. Paving done during the period between October 15th and May 1st shall be in accordance with Subsection 405.3.1 of the "State Specifications".

B. Mortaring Adjusting Rings.

1. Mortar for adjusting rings may only be placed when the air temperature is at least 35°F and rising or at least 40°F when falling.
2. Mortaring and concrete placement shall be in accordance with Subsection 415.5.13 of the "State Specifications".

605. ROCK EXCAVATION

- A. Rock excavation shall be in accordance with Section 2.2.9 of the "Standard Specifications". The payment width for rock excavation in open-cut shall be the actual width of excavated trench, but not to exceed the outside diameter of the pipe plus 24 inches. The bottom of rock shall be measured to no lower than 4 inches below the barrel of the pipe. The vertical limits of rock may be measured by stripping earth overburden prior to blasting or removal or by other methods mutually acceptable to both the Engineer and Contractor. One such method may be to measure the depth of rock exposed on trench walls after blasting and excavation have been completed.

606. PREVENTION OF PIPE FLOTATION

- A. The Contractor shall at all times prevent the possibility of pipe flotation, i.e.: the lifting of pipes by buoyancy as water rises in the trench by proper bracing or by loading to overcome buoyancy. All pipe damaged by flotation shall be removed and relaid at the Contractor's expense.

607. PORTABLE TRENCH BOX

- A. The use of portable trench boxes and sliding trench shields shall conform to Section 2.3.6 of the “Standard Specifications”, as modified below:
1. Trench boxes or shields used within trenches in which the pipe is installed with Class “B” or Equivalent Bedding, including flexible sewer pipes and PVC water main, shall ride on a shelf excavated in the trench to ensure that the proper bedding section is achieved and maintained.
    - a. 4” Through 16” I.D. Pipe. The shelf shall be located no lower than the top of the pipe, except that it shall not be placed more than 24 inches above the trench bottom unless the provisions of Paragraph 2 below are met.
    - b. 18” Through 30” I.D. Pipe. The shelf shall be located no lower than the springline of the pipe, except that it shall not be placed more than 24 inches above the trench bottom unless the provisions of Paragraph 2 below are met.
    - c. 36” Through 60” I.D. Pipe. The shelf shall be located no lower than 24 inches above the trench bottom unless the provisions of Paragraph 2 below are met.
  2. Current OSHA standards allow placing trench boxes or shields on a shelf located no more than 24 inches above the bottom of the trench if the following conditions are met:
    - a. The trench walls consist of reasonably stable soils.
    - b. The trench bottom is not wet. (Note that all standing water shall be pumped or removed from the trench in order to meet this condition.)
- B. Recompaction of Class B or Equivalent Bedding.
1. If a trench box or shield is supported or rides within bedding or cover material located below the top of a pipe in trenches in which the pipe is installed with Class “B” or Equivalent Bedding, including flexible sewer pipes and PVC water main, the Contractor shall recompact bedding and cover material to the top of the pipe after removing the box or shield as follows:
    - a. First, thoroughly compact bedding and cover material per the provisions of Paragraphs 201.A.1.a.(3) (sanitary sewer), 401.A.3.e

(storm sewer), and 501.A.3.a.(1) (water main) of these Special Provisions before moving the trench shield; then

- b. lift the trench shield so that it rides on top of the cover material;
  - c. recompact the bedding and cover material so that there are no voids between the pipe and trench walls; and
  - d. pull the trench shield ahead.
2. Alternate method(s) of recompacting bedding and cover material disturbed by the trench box or shield may be used if approved by the Engineer.

#### 608. MANUFACTURER'S REPRESENTATIVE

- A. The pipe manufacturer shall have a representative available to the Contractor and Engineer for the purpose of advising them in the proper method of laying pipe and making watertight joints. It is the intent of this requirement that the representative spend only such time on the job as will accomplish the desired result of satisfactory installation practice. The presence of such representative, however, or the partial payment made for pipe as delivered, shall not relieve the Contractor of his responsibility under these Special Provisions. All pipe laying and making of all joints shall be done strictly in accordance with the manufacturer's directions, however, the Contractor shall be responsible for the watertightness specified.

#### 609. HANDLING PIPE AND ACCESSORIES

- A. Proper equipment, tools and facilities shall be provided and used by the Contractor for the safe and convenient prosecution of the work. Pipe, fittings, valves and other accessories shall at all times be handled with care to avoid damage. In loading and unloading they shall be lifted by hoist or derrick or rolled on skidways in such manner as to avoid shock. Pipe unloaded by skidding shall be protected from bumping contact with other pipe or the ground. Under no circumstances shall pipe be dropped.
- B. The Contractor shall carefully examine all pipes and other materials immediately before placing in the trench, and if any such pipes or materials are found to be defective they shall be rejected and removed from the work site.

## 610. BORING AND JACKING

### A. General.

1. Boring and jacking shall be in accordance with the provisions of Chapters 2.4.0. and 4.13.0., File No. 49 of the "Standard Specifications", as amended herein, and Village requirements.
  - a. The diameter of borings shall be no greater than the outside diameter of the bell of the lateral pipe or casing plus two inches. Voids occurring between the pipe and the undisturbed natural soil shall be backfilled with backfill concrete or cellular concrete.
  - b. Amend File No. 49 to delete the requirement for constructing concrete bulkheads in the ends of casing pipes installed under railroads.
  - c. Where the ends of the casing are below ground they shall be suitably protected against the entrance of foreign material, but shall not be tightly sealed.
  - d. Where the ends of the casing are above ground surface and above high water level, they may be left open provided drainage is afforded in such manner that leakage will be conducted away from railway tracks or structures.
2. Casing pipe shall be installed by jacking unless placement of casing pipes in open-cut trenches is indicated on the Plans.
3. Jacking pits shall be located as shown on the Plans.

### B. Subsurface Conditions.

1. It is the Contractor's responsibility to familiarize himself with subsurface conditions at the site of boring or jacking work and the Contractor shall be responsible for complete and accurate installation regardless of the subsurface conditions encountered.
2. Utility Conflicts.
  - a. The Contractor shall verify the location of all utilities adjacent to the boring prior to performing boring or jacking operations. Verification shall include exposing all utilities (at both ends of the boring) that could potentially interfere with boring or jacking operations.

- b. The Contractor shall be liable for all costs associated with reboring or rejackng pipes due to utility conflicts that the Contractor was responsible for locating and identifying.

C. Alignment.

- 1. The Contractor shall be responsible for maintaining proper line and grade of the boring or casing pipe and shall check the alignment during boring or jacking operations at intervals he feels are necessary to maintain the proper alignment. The casing shall be installed at a positive or negative grade as indicated on the Plans with no intermediate high or low points. Misalignment of the bore or casing pipe shall be corrected at the Contractor's expense.
  - a. Casing pipe shall be installed by jacking at the grade shown on the Plans. Final alignment of the casing pipe shall be within three (3) inches of line and grade for sewers and within six (6) inches of line and grade for water main.
    - (1) The grade of the casing pipe, including both end elevations, will be checked by the Engineer upon completion of jacking operations and prior to backfilling of jacking pits. The Contractor shall expose both ends of the casing and shall provide any assistance required by the Engineer when checking grade. The Contractor shall provide the Engineer with at least 24 hours advance notice when requesting alignment checks.
  - b. Sanitary sewer laterals installed by boring shall be placed at a grade of 1/4 inch per foot (2.08%) unless shown otherwise on the Plans. Vertical alignment of the completed bore shall be within 4 inches of grade and shall provide a continuous positive lateral grade.

D. Casing Pipe.

- 1. Casing pipe shall be ASTM A-53, Grade B, welded steel pipe with a minimum yield strength of 35,000 psi and thickness(es) of not less than:

Carrier Pipe Largest O.D.	Standard Size Casing Pipe	Casing	
		Minimum Wall Railroad	Minimum Wall Highway
10-3/4"	16"	.250"	.250"
16"	20"	.312"	.250"
20"	24"	.375"	.313"
24"	30"	.438"	.344"
30"	36"	.563"	.375"
36"	42"	.625"	.438"
42"	48"	.625"	.500"

E. Inserting Carrier Pipe.

1. Carrier pipes installed within casing pipes shall rest on skids or centering devices securely fastened to the pipe to prevent slipping or twisting as the carrier pipe is inserted into the casing pipe. If metal strapping is used, it shall be grade 316 stainless steel and shall be positioned and secured so it can not come into contact with the casing pipe. Skids shall be placed circumferentially around the carrier pipe and spaced at intervals to prevent the carrier pipe bell from contacting the casing pipe.
  - a. The thickness of skids shall be varied through the casing, if required, to provide a positive grade on the carrier pipe.
  - b. If carrier pipes twist or turn during insertion operations, the pipe shall be withdrawn and reinserted until the carrier pipe rests level on the skids as inserted.
2. Skids or centering devices shall be designed to support the full weight of the carrier pipe full of water without imparting excessive point loading to the carrier pipe wall as determined by the pipe manufacturer. Skids or centering devices shall be placed, as a minimum, three per pipe length, one at each end approximately one foot from the joint and at the mid-point of the pipe length. Additional casing spacers may be required to support the weight of the loaded pipe as stated above. Two additional spacers shall be placed approximately one foot apart and one foot inside each end of the casing pipe.
  - a. Skids shall be a minimum of three feet long 4" x 4" nominal maple hearts or approved equal with banding grooves that will prevent the bands and pipe bells from coming in contact with the casing.
  - b. Centering devices shall be RACI, Cascade, or Advance casing spacers or equal. Submit shop drawings, design data and loading calculations to Engineer for approval.

3. Contractor shall provide three copies of shop drawings and calculations indicating the design loading, circumferential spacing and longitudinal spacing. The calculations shall include a safety factor of not less than two.
4. Upon completion of the insertion of the carrier pipe within the casing, the ends of the casing shall be sealed to prevent infiltration of bedding material. Rigid end seals that may result in a shear plane are not allowed. Flexible end seals shall be wrap around type manufactured to fit the casing and carrier pipe O.D.s with an adequate overlap for sealing with mastic cement. The seal shall be minimum 1/8 inch thick neoprene rubber fastened to the casing and carrier pipes with stainless steel bands with stainless steel screw assemblies.
5. Amend Paragraph 6.2.3(b) of the "Standard Specifications" to read in part: "The annular space between the casing and carrier pipes shall not be filled."

#### 615. WATERWAY AND WETLAND CROSSINGS

- A. The Contractor shall comply with all of the conditions of stream and/or wetland crossing permits issued by the State Department of Natural Resources and the Army Corps of Engineers. These permits have been obtained by the Developer or Village and are available for review and/or are included in the Appendix. A partial list of conditions of these permits is as follows:
  1. None of the excavated materials shall be deposited, either temporarily or permanently, upon any part of the bed of the waterway below the high waterline and all spoil shall be placed out of the hydraulic floodway. Surplus excavated material shall not be deposited in any wetland area.
  2. No dams, causeways, roadways, fills or other similar temporary or permanent devices are to be placed below the ordinary high water mark unless authorized by the DNR.
  3. The removal of materials shall be done with suitable equipment, approved by the DNR, utilizing methods to minimize turbidity and deposition of silt downstream of the project area.
  4. The trench shall be backfilled with clean washed gravel, free of excessive fines.
- B. The Contractor may use construction methods conflicting with conditions of stream crossing permits only if approved by the State Department of Natural Resources. Contact Ms. Mary Ellen Vollbrecht, District Shoreland Supervisor, at (414) 263-8694 or the Water Management Specialists listed below for information on alternate construction methods.

1. Walworth County:  
Pam Schense (262) 574-2136

C. Wetland Crossings.

1. The Contractor shall abide by the following conditions, as well as any additional permit conditions, when crossing wetlands:
  - a. Confine equipment and construction activities to the narrowest corridor possible.
  - b. Schedule construction during winter months or dry summer periods.
  - c. The use of removable pads or mats to support equipment are preferred over placing fill material for support.
2. Groundwater Barriers.
  - a. Construct low permeability soil dams consisting of thoroughly compacted native soils (silt or clay soils only) in lieu of bedding and cover material for a length of three feet to prevent groundwater migration from wetland areas through the bedding stone.
  - b. Place barriers at a maximum spacing of 150 feet across and beyond the edges of wetlands as shown on the Plans.
3. Backfilling Excavations.
  - a. Backfill excavations across wetlands with native excavated material placed in layers in the reverse order that they were taken out.
  - b. Stockpile topsoil (approximately 12 inches thick) for placing over the top of trenches so that native vegetation (from existing roots and seeds) may be reestablished.
  - c. Excess material shall be immediately removed from wetland areas.
4. Trench Restoration.
  - a. Restore wetlands immediately upon completion of trench backfilling operations.

- b. Place existing wetland topsoil (containing existing roots and seeds) over the top of trenches through wetlands so that native vegetation may be established.
- c. Reseed disturbed areas with non-aggressive native species. The seed mixture shall not contain "invader" species such as Reed Canary Grass. Seed mixtures shall be approved by the Engineer.

## 620. SANITARY SEWER LATERAL RELAY

### A. Definition of Conflict.

#### 1. Storm Sewer Conflict.

- a. The Contractor shall take all precautions necessary to protect sanitary sewer laterals not conflicting with the new storm sewer from being damaged. Conflict between sanitary sewer laterals and storm sewer is defined as those laterals with less than four (4) inches of separation from the storm sewer. The Contractor shall relay laterals conflicting with the storm sewer to provide four (4) inches minimum of clearance unless directed otherwise by the Engineer.

#### 2. Water Main Conflict.

- a. The Contractor shall take all precautions necessary to protect sanitary sewer laterals not conflicting with the new water main from being damaged. Conflict between sanitary sewer laterals and water mains is defined as those laterals with less than six (6) inches of separation from the water main. The Contractor shall relay laterals conflicting with the water main to provide six (6) inches minimum of separation where laterals pass under water mains and eighteen (18) inches minimum of separation where laterals pass over water mains.

### B. Construction Procedure.

- 1. Conflicting sanitary laterals shall be relaid from the main sewer line to a point two feet past the new water main or storm sewer. Lateral pipe material shall match the size of the existing lateral.
- 2. The connection to the main sewer shall be made with a new wye or tee, unless the existing connection is satisfactory, with the lateral opening placed at the springline of the main sewer and the lateral laid at a minimum 1.04% grade or as required to provide the necessary clearance.

3. Changes in vertical alignment may be made using bends.

C. Lateral Pipe Material.

1. Sanitary sewer lateral pipe material shall be polyvinyl chloride (PVC) or clay pipe conforming to the following:
  - a. Polyvinyl chloride (PVC) sewer pipe meeting the requirements of ASTM D-3034, SDR-35, with integral bell type flexible elastomeric joints meeting the requirements of ASTM D-3212.
  - b. Extra strength vitrified clay pipe meeting the requirements of ASTM C-700 with glazed finish and gasket joints meeting the requirements of ASTM C-425.
  - c. Wherever possible, new pipe material used shall match the existing.

625. WATER SERVICE RELAY

A. Definition of Conflict.

1. The Contractor shall take all precautions necessary to protect water services not conflicting with the new sewer from being damaged. Conflict between water services and sewers is defined as those services with less than six (6) inches of separation from the sewer. The Contractor shall relay services conflicting with new sewers to provide six (6) inches minimum of separation where services pass over sewers and eighteen (18) inches minimum of separation where services pass under sewers.

B. Construction Procedure.

1. Water services shall be relaid as directed by the Engineer and shall be placed to provide a minimum of six (6) feet of cover.
2. Services will typically be relaid to points two feet on each side of the new sewer.
3. Amend Section 5.5.8 of the "Standard Specifications" to require the Contractor to install corporation stops.

C. Water Service Pipe Material.

1. Water service piping shall be Type "K" soft annealed seamless copper water tube, matching the existing size, and conforming to ASTM

Designation B-88. Fittings shall be of cast brass conforming to paragraph 6.24.3. of the "Standard Specifications".

#### 630. WATER MAIN OFFSETS

##### A. Definition of Conflict.

1. The Contractor shall take all precautions necessary to protect water mains not conflicting with the new sewer from being damaged. Conflict between water mains and sewer is defined as those mains with less than six (6) inches of separation from sewers. The Contractor shall offset water mains conflicting with new sewers to provide six (6) inches minimum of separation where mains pass over sewers and eighteen (18) inches minimum of separation where mains pass under sewers.

##### B. Construction Procedure.

1. Water mains shall be offset as directed by the Engineer and shall be placed to provide a minimum of six (6) feet of cover.
  - a. Water mains shall be offset down only (under the conflicting utility) to prevent high points being created in the offset.
2. Water main offsets shall be in accordance with File No. 47 of the "Standard Specifications", as modified below.
  - a. Offset castings may be used when the change in grade is 24 inches or less.
  - b. Joint restraint may be provided by either strapping or using mechanical joint retainer glands. Retainer gland set screws shall be tightened to 75 foot-pounds torque or as recommended by the manufacturer using a torque wrench. Special restrainer fittings, as manufactured by the Uni-Flange Corporation, or equal, may be used on PVC pipe.
3. High points in mains, created by water main offsets, shall be tapped to bleed off all trapped air.

##### C. Water Main Materials.

1. Water main pipe material shall be ductile iron pipe meeting the requirements of AWWA Standard C-151 (ANSI 21.51), Class 52, cement mortar lined with internal and external bituminous coating and mechanical joints with rubber gaskets and cable bonding for electrical conductivity.

Fittings shall be of the same material as water main. Polyethylene wrap shall be placed on all water main where the existing pipe is wrapped.

635. TRACER WIRE

A. Tracer wire shall be installed with all underground utilities and storm sewers including laterals installed under this Contract, which are not identified by surface facilities such as manholes. Installation shall conform to Subsection 4.3.14, File No. 24A and File No. 24B of the Standard Specifications and the following Special Provisions.

B. Material.

1. Tracer wire for use in open cut construction shall be 10 gauge multiple stranded copper wire insulated for underground installation. Tracer wire for use with horizontal directional drilling shall be 8 gauge multiple stranded copper wire insulated as specified above.

2. Tracer wire insulation shall conform to the uniform color code adopted by the American National Standard Institute. Tracer wire for:

- a. Sanitary sewer and laterals shall be green.
- b. Water mains and services shall be blue.
- c. Force mains shall be green with yellow stripe.
- d. Storm sewers and laterals shall be green with red stripe.

Note: If wire with identifying stripes as in c or d above is not readily available, the Contractor shall identify coils at ends of laterals and mains in access boxes with electrical "phase" marking tape of the same color as that called for stripes.

3. Splices.

- a. Tracer wire shall be continuous between exposed connection points unless splicing is approved by the Engineer.
- b. Wire splices shall be in accordance with standard electrical practices. Acceptable wire splices are brass split bolts, Dryconn Waterproof Connectors, Snap-loc Model LV 9500, or approved equal. Wire nuts are not acceptable.

- (1) Branch connections utilizing split bolts. Splice branch tracer wire to the main tracer wire using the following procedure:
  - (a) Bare tracer wire on main line (do not cut).
  - (b) Connect branch wire to main line with brass split-bolt.
  - (c) Seal the connection with rubber electrical tape and overwrap with 2 layers of polyethylene adhesive tape 1-1/2" wide and 8 mils thick.
- (2) Branch connections utilizing other approved connectors, follow manufacturers' recommendations.

C. Installation.

1. In open cut construction, place the tracer wire at the springline of the main or lateral and tape to the pipe at 5 foot intervals.
2. For horizontal directional drilling type construction, tape the tracer wire to the pipe at 5 foot intervals leaving sufficient slack to accommodate the stretching of the pipe during pull-back.

D. Electrical Connections.

1. Electrical connections to tracer wire identifying water main shall be provided by extending the tracer wire through access boxes located directly in back of all hydrants and securely connected thereto. Place the top of the access box flush with the ground surface and leave 18 inches of slack in the wire for future connection.
2. Tracer wires identifying sanitary sewer and storm sewer laterals and water services shall be accessed in an access box located adjacent to the water service curb valve box at each lateral location. The tracer wire shall extend to the end of the lateral or service.
  - a. An electrical tracer wire junction box shall be fastened to the house (by the homeowner) over the sewer line if the sewer and water services are in separate trenches. Connect tracer wire to stainless steel wingnuts in the junction box.
3. Tracer wires identifying force mains shall be accessed in access boxes at approximately 500 foot intervals, at all angle points, at all concrete markers, and at other convenient locations as shown on the Plans.

4. Access Box.

- a. Access boxes shall be constructed of cast iron and ABS components with a tamper proof cover lettered "ELECTRIC" and a cast-in pentagonal bolt opened with a standard pentagonal key. Provide stainless steel terminal bolts on the cover for attaching tracer wire. Access boxes shall be manufactured by C. P. Test Services - Valvco, Inc. as supplied by HD Supply (262-786-4240), or equal. See the details in the Appendix.

E. Testing.

1. The Contractor shall test all tracer wire for electrical continuity prior to acceptance of the main or service lateral to which it is accessory.

640. SUPPORT OF UNDERGROUND STRUCTURES

A. General.

1. Delete Subsection 2.6.5 of the "Standard Specifications" and replace with the following requirements.
2. The Contractor shall support utilities crossing trenches. Utilities requiring support include: sanitary sewers and laterals, storm sewers including catch basin leads and sump pump leads, water mains including services greater than 2 inch size, field tile lines, gas lines and telephone conduits. Generally, only utilities greater than 2 inches in size require support.

B. Means of Support.

1. The Contractor shall use Option One to support utilities unless the Engineer approves the use of Option Two.
2. Option One (Typical):
  - a. Backfill below the utility with compacted granular or slurry backfill conforming to Section 700 of these Special Provisions. Place granular or slurry backfill to one foot minimum beyond the edge of the crossing utility and place at a maximum 1:1 slope.
  - b. Place bedding and cover material in accordance with pertinent sections of the "Standard Specifications".

3. Option Two (With Engineer's Approval):
  - a. Support the utility using reinforced concrete beams conforming with File No. 2 of the "Standard Specifications".
  - b. Place bedding and cover material in accordance with pertinent sections of the "Standard Specifications".
4. Backfill trenches above utilities with the backfill material specified on the Plans.

## 650. EROSION CONTROL

### A. General.

1. The Contractor shall take all measures necessary to minimize erosion, water pollution and siltation caused by construction of this project. Erosion control measures shall be in accordance with Chapter 2.8.0 of the "Standard Specifications", Subsection 107.20 and Section 628 of the "State Specifications", the details shown on the Plans and these Special Provisions.

The Contractor shall use the standards prepared by the Wisconsin Department of Natural Resources as a reference and guide for erosion control practices. The standards are maintained and located on the Wisconsin Department of Natural Resources website at:

[www.dnr.wi.gov/runoff/stormwater/techstds.htm](http://www.dnr.wi.gov/runoff/stormwater/techstds.htm)

The Contractor shall comply with the provisions of local erosion control plans and/or ordinances.

2. Village Erosion Control Ordinance.
  - a. The Contractor shall comply with the provisions of Ordinance No. 97-3, Erosion Control, of the Village of East Troy.
3. Erosion Control Plan.
  - a. Prior to beginning work, the Contractor may be required to submit an erosion and sediment control plan, detailing specific measures that will be employed in the various stages of construction for approval by the Engineer.

4. Implementation/Maintenance.

- a. The Contractor shall not begin work until after initial erosion and sediment control devices are in place and approved by the Engineer.
- b. Maintain erosion control measures as needed until after lawn areas have been stabilized.

B. Erosion Control Measures.

- 1. Erosion control measures shall include, but not be limited to the following:
  - a. Divert upstream runoff from flowing through the construction site.
  - b. Protect downstream or adjacent waterways and wetlands with silt fence.
  - c. Delay stripping topsoil until required for construction.
  - d. Place silt fence or erosion control bales in ditches and other drainageways to collect sediment and to slow the velocity of runoff.
  - e. Construct sedimentation basins.
  - f. Protect storm sewer inlets and the upstream end of culverts with silt fence or erosion control bales.
  - g. Prompt removal of excavated material.
  - h. Proper storage of backfill and bedding materials including placing silt fence or erosion control bales on the downslope sides of spoil piles.
  - i. Construction of gravel access roads to construction sites to prevent sediment from being tracked onto roadways.
  - j. Prompt (same-day) cleanup of material tracked onto adjacent streets.
  - k. Timely restoration of damaged surface areas.
  - l. Temporary seeding.

- m. Install silt fence on both sides of the construction corridor through wetland areas as well as at all edges of wetland areas.

2. Temporary Erosion Control Measures.

- a. The Contractor shall construct temporary erosion control measures, where erosion is likely to be a problem, prior to beginning work on those section(s) of the project. Temporary erosion control measures shall be maintained until after permanent erosion control, such as seeding or sodding, has been established.
- b. In the event that permanent erosion control measures are not fully implemented in the current construction season, the Contractor shall be responsible for maintaining all necessary temporary erosion control measures until after permanent measures have been completed in the following year.

C. Construction Pit Dewatering.

- 1. The Contractor may be required to treat effluent from construction pit dewatering prior to the direct discharge to surface waters or wetlands. Treatment methods include seepage basins, settling basins and mechanical means. Refer to Subsection 102.A of these Special Provisions for instructions for obtaining discharge permits.

D. Construction Within Drainageways.

- 1. Construction work within ditches or drainage swales shall not be allowed to disrupt the existing drainage pattern for a distance greater than 500 feet at one time unless otherwise approved by the Engineer. The Contractor shall be responsible for providing temporary drainage around the work area when existing drainage patterns are interfered with.
  - a. Protect the upstream end of culverts with silt fence or erosion bales.
- 2. Ditches shall be reshaped to their existing cross-section immediately after construction work on that section of the project has been substantially completed. The Contractor shall take all measures necessary to prevent erosion of drainageways.
- 3. Temporary and permanent erosion control measures, including erosion bales, silt fence and lawn restoration, shall be performed in a timely manner and in accordance with the requirements of these Special Provisions.

E. Installation, Inspection, Maintenance and Restoration of Erosion Control Devices.

1. General.

- a. This subsection applies to all erosion control devices used on this project.

2. Installation.

- a. Install or place erosion control devices either (as appropriate):
  - (1) Prior to beginning construction activities;
  - (2) Immediately after grading of ditches or slopes is completed;
  - (3) Immediately after completing lawn restoration; and/or
  - (4) When so directed by the Engineer.

3. Inspection.

- a. Inspect erosion control devices:
  - (1) Within 24 hours after each 0.5 inch or greater rainfall;
  - (2) At least daily during prolonged rainfall; and
  - (3) At least once every seven days.

4. Maintenance.

- a. Maintain erosion control devices for the duration of the project and until after slopes and ditches have been stabilized and turf developed to the extent that future erosion is unlikely, at which time the Contractor shall remove the temporary erosion control device(s).
- b. Remove sediment deposits when the build-up exceeds approximately one-half the volume capacity of the erosion control device.

5. Restoration.

- a. Restore areas immediately after removing erosion control devices by reshaping or regrading and placing topsoil, fertilizer, seed and

mulch. Place erosion mat, if required to control erosion or if so directed by the Engineer.

F. Erosion Bales.

1. The Contractor shall place erosion bales of straw, hay or other suitable baled material to form checks or dikes as required to control erosion, including at locations shown on the Plans and/or as directed by the Engineer. Placement and maintenance of erosion bales, shall be in accordance with Subsection 628.3.3 of the "State Specifications" and the Standard Detail Drawings included in the Appendix.
2. Installation and Removal.
  - a. Place erosion bales (double rows) immediately after shaping of ditches or slopes is completed.
  - b. Remove bales after turf has been developed and slopes and ditches have been stabilized. Regrade and restore areas from which bales have been removed with topsoil, fertilizer, seed, mulch and erosion mat if required.

G. Silt Fence.

1. The Contractor shall place silt fence as required to control erosion, including at the locations shown on the Plans and/or as directed by the Engineer. Silt fence shall be placed and maintained in accordance with Subsection 628.3.4 of the "State Specifications" and the Standard Detail Drawings shown included in the Appendix. The Contractor may install silt fence using either Alternate "A" or Alternate "B", except that all fabric shall be reinforced and furnished with a top support cord.

In areas of heavy runoff, when directed by the Engineer, the silt fence shall be erected as follows:

- a. Install silt fence using Alternate "A" except place support stakes at 4 foot maximum intervals.
  - b. Use wire support fence and tie backs as required.
2. Ditches/Drainageways.
  - a. Silt fence placed in ditches or drainageways shall extend up the sides of ditches to an elevation which is higher than the top of the fabric located at the lowest point of the ditch.

3. Installation.

- a. Erect silt fence prior to starting any construction operation which might cause any sedimentation or siltation at the site of the proposed silt fence.

4. Inspection, Maintenance and Restoration.

- a. The Contractor shall inspect and maintain silt fences in accordance with Subsection 628.3.4.2 of the "State Specifications". Silt fences shall be inspected immediately after each rainfall and at least daily during prolonged rainfall. Sediment deposits shall be removed when the deposit reaches approximately one-half of the volume capacity of the silt fence.
- b. The Contractor shall maintain silt fences for the duration of the project and until after slopes and ditches have been stabilized and turf developed to the extent that future erosion is unlikely; at which time the Contractor shall remove the silt fence.
- c. Regrade and restore areas from which silt fence has been removed with topsoil, fertilizer, seed, mulch and erosion mat if required.

H. Wetland Protection.

- 1. The Contractor shall install a sediment filtration device within wetlands, where shown on the Plans and as directed by the Engineer. The device is used in place of silt fence, allowing greater water passage than silt fence while trapping soil particles.
- 2. Material.
  - a. The sediment filtration device (biodegradable) shall be "Sediment STOP" manufactured by North American Green of Evansville, Indiana, or equal.
- 3. Installation.
  - a. Install the device per manufacturer's recommendations.

I. Erosion Mat.

- 1. General.
  - a. The Contractor shall place erosion mat over all restored ditches (bottoms and side slopes), slopes greater than 10%, areas shown on

the Plans or specified below and/or as directed by the Engineer. The Contractor may also place erosion mat to improve grass seed germination and growth.

2. Material.

- a. Erosion mat materials shall be as specified herein and/or in the Wisconsin Department of Transportation's Product Acceptability Lists (PAL) included in the Appendix.

(1) Low Flow (Ditches - Typical).

- (a) Erosion mat shall be WisDOT Class I, Type B, double netted mat.

(2) High Flow (Specified on Plans).

- (a) Erosion mat shall be WisDOT Class II, Type B, long lasting organic mat.

(3) Urban - Short Term (Residential Lawns).

- (a) Erosion mat shall be WisDOT Class I, Urban, Type A, short term except the mat shall be double netted. Use biodegradable anchoring devices only per PAL.

3. Installation.

- a. Install erosion mat in accordance with Subsection 628.3.2 of the "State Specifications", the details in the Appendix and the manufacturer's recommendations. The Contractor shall provide the Engineer with one (1) full set of manufacturer's literature and installation instructions for each product prior to installing erosion mat.

J. Stone Check Dam.

1. The Contractor shall construct stone check dams in ditches or drainageways at the locations shown on the Plans and/or as directed by the Engineer. Construct stone check dams in accordance with the details in the Appendix.

K. Inlet Protection.

1. The Contractor shall protect all existing and new catch basins and storm sewer inlets, both within the construction limits and downstream of the

project as noted on the Plans and as directed by the Engineer, from erosion using inlet protection in accordance with Subsection 628.3.13 of the “State Specifications” and the Standard Detail Drawings in the Appendix.

L. Stone Tracking Pad.

1. The Contractor shall install stone tracking pads, to reduce the amount of sediment tracked onto roads, at the locations shown on the Plans, at other access points, and as directed by the Engineer.
2. Construction.
  - a. Construct pads using a minimum of 12 inches of 3” to 6” clean aggregate with minimum dimensions of 12 foot in width (matching the width of the egress point) by 50 feet in length. Construct pads on a WisDOT Type R geotextile fabric in wet ground conditions. Extend and/or widen pads if required to prevent tracking.
  - b. Repair and clean pads as required.
  - c. Remove tracking pads after construction has been completed and restore the area.

M. Soil Stabilizer

1. General.
  - a. The Contractor shall apply soil stabilizer over all disturbed areas where final lawn restoration has not been completed (i.e., topsoil, seed, mulch, and matting) and erosion is occurring, if so directed by the Engineer.
2. Material.
  - a. The soil stabilizer shall be on WisDOT’s Product Acceptability Lists (PAL) and shall be a Type B anionic polyacrylamide. Approved products are listed below.

<u>Product Name</u>	<u>Manufacturer</u>
Natural Earth PolyStable Plus	Earth & Road
CF 2000 Polymer	Construction Fabrics and Materials (CFM)

3. Application.

- a. Apply soil stabilizer in accordance with Subsection 628.3.12 of the “State Specifications” and the Department of Natural Resources (DNR) Conservation Practices Standards 1050.
- b. Test soil types to ensure proper material selection.
- c. Apply per manufacturer’s recommendations. Provide the Engineer with a copy of the manufacturer’s product literature and suggested application method(s).
- d. Do not apply to channel bottoms.

N. Immediate Lawn Restoration.

1. The Contractor shall restore lawn areas, as shown on the Plans, immediately after completing work on those sections of the project.
2. Lawn restoration shall comply with Subsection 820.A. of these Special Provisions.

O. Sodding.

1. The Contractor shall place sod at the locations shown on the Plans. Sod shall be placed immediately after completing work on these sections of the project.
2. Sodding shall comply with Subsection 820.B. of these Special Provisions.

P. Sod Ditch Checks.

1. The Contractor shall construct sod ditch checks at locations shown on the Plans and in accordance with the details shown on the Plans and the Standard Detail Drawings included in the Appendix.
2. Sodding shall comply with Subsection 820.B of these Special Provisions.

Q. Temporary Sedimentation Basins.

1. The Contractor shall construct temporary sedimentation basin(s) at location(s) shown on the Plans. The basins shall be filled in and banks removed after slopes and ditches have been stabilized and turf developed to the extent that future erosion is unlikely. The basin area shall be reshaped and restored by seeding in accordance with Subsection 820.A of these Special Provisions.

2. Polymers (Settling Suspended Sediment).

- a. The Contractor shall install product(s) containing polymers to promote settling out of suspended sediments in ponds and/or sediment basins if required to improve the sediment removal efficiency of the basin or as directed by the Engineer.
- b. Material.
  - (1) The polymer shall comply with DNR Conservation Standard 1051, be on WisDOT's Product Acceptability Lists (PAL) and shall be in the anionic form only.
  - (2) Use "Floc Logs" as manufactured by Applied Polymer Systems, Inc., of Woodstock, Georgia, or equal.
- c. Installation.
  - (1) Place the product in ditches or swales upstream of all sediment traps and detention/retention basins used for sediment control. Install the product in the lower one-third of the swale, about 100 feet upstream of the basin to provide mixing and reaction time, to intercept and treat as much runoff as possible.
    - (a) Application locations may be shown on the Plans.
  - (2) Install the polymer product in accordance with the Department of Natural Resources (DNR) Conservation Practices Standards 1051.
  - (3) Test soil types to ensure proper material selection.
  - (4) Install per manufacturer's recommendations. Provide the Engineer with a copy of the manufacturer's literature and suggested application method(s).

L. Temporary Seeding.

- 1. The Contractor shall restore all grass and terrace areas within sections shown on the Plans as "Temporary Seeding" with a temporary seeding composed of 100% oats (annual rye grass - optional) at a seeding rate of 2 pounds per 1,000 square feet. Temporary seeding shall include placing topsoil in accordance with Subsection 820.A of these Special Provisions. The temporary seeding shall be placed within 14 days after work on the

project has been substantially completed. Permanent lawn replacement shall be placed as early as possible in the spring of the following year, but no later than May 15th.

## 655. EROSION CONTROL PLAN

### A. Erosion Control Measures.

All erosion control measures shall be in accordance with Section 650 of these Special Provisions and the provisions of the Wisconsin Department of Natural Resources website for the erosion control technical standards at [www.dnr.wi.gov/runoff/stormwater/techstds.htm](http://www.dnr.wi.gov/runoff/stormwater/techstds.htm).

### B. Construction Activity.

#### 1. Description.

Major construction activities on this project include:

- a. clearing and grubbing
- b. site grading
- c. detention pond(s)
- d. ditching
- e. road construction
- f. sanitary sewer
- g. water main
- h. storm sewer

#### 2. Construction Sequence.

Construction activities will generally consist of the following work sequence:

- a. install temporary erosion control
- b. clearing and grubbing
- c. construct detention ponds for temporary use as sediment traps
- d. construct ditches to divert or direct runoff
- e. site grading and rough cut roads

Opt.—Strip topsoil from road right-of-ways prior to utility construction.

- f. install sanitary sewer, water main, and storm sewer

- g. finish grade roadways and complete site grading
- h. place salvaged topsoil, fertilize, seed, and mulch, and install permanent erosion control measures

C. Erosion Control Sequence.

No construction may proceed until after the appropriate erosion control devices have been installed and approved by the Engineer. Erosion control measures or devices shall be installed in the following sequence, unless otherwise approved by the Engineer.

1. Preconstruction Erosion Control Measures.

- a. Install silt fence around the project perimeter.
- b. Construct sediment traps.
- c. Construct detention ponds if used for sediment control.
- d. Protect existing culverts and storm inlets with erosion bales or silt fence.
- e. Construct stone construction site access roads.

2. Erosion Control Measures Installed During Construction.

- a. Place erosion bales in rough graded drainageways and roadside ditches.
- b. Protect stockpiles with silt fence.
- c. Immediate restoration of critical areas such as stream banks.
- d. Maintenance of erosion control devices.

3. Permanent Erosion Control Measures

- a. Seed and mulch immediately after placing topsoil.
- b. Place sod in highly erodible areas.
- c. Install erosion control fabric.
- d. Place erosion bales on steep slopes in ditches.

4. Post Construction Activities.

- a. Remove all temporary erosion control devices after permanent erosion control has been established and the site is stabilized.
- b. Restore areas from which erosion control devices have been removed by seeding, mulching, and erosion mat or sodding as directed by the Engineer.

700. BACKFILLING UTILITY TRENCHES

A. Excavated Material Backfill. (Outside of existing or proposed paved or graveled areas.)

- 1. Excavated material, in accordance with Section 6.43.5 of the "Standard Specifications", may be used to backfill trenches located outside of existing or proposed paved or graveled areas or as shown on the Plans, except as provided for in Paragraph 2 below.

- a. If excavated material is unsuitable for backfilling, trenches shall be backfilled with granular material when so ordered by the Engineer.

2. Granular Backfill Required in Place of Excavated Material Backfill.

- a. The following categories of trenches, in sections specified on the Plans as excavated material backfill, shall be backfilled with granular material. The cost of furnishing and placing granular backfill and disposing of excavated material shall be included in the unit price(s) bid for utilities.

(1) Manholes and Valve Boxes Located Within Improved Surfaces.

- (a) Trenches within fifteen (15) feet of manholes (measured from the center of manholes) located within existing or proposed roadways or other paved or graveled surfaces, shall be backfilled with granular material.

- (b) Trenches within ten (10) feet of valve boxes located within existing or proposed roadways or other paved or graveled surfaces shall be backfilled with granular material.

(2) Driveways, Parking Areas, and Cross Streets.

- (a) Trenches through paved or graveled surfaces, such as driveways, parking areas, or cross streets, but not including parallel gravel shoulders, in sections allowing excavated material backfill, shall be backfilled with granular material within one half-to-one slopes extending downward and outward from the edges of such improved surfaces.

(3) Parallel Pavements.

- (a) Trenches extending to within or under parallel and adjacent paved roads and shoulders (but not including gravel shoulders) in sections allowing excavated material backfill, shall be backfilled with granular material.

(4) Sewer Laterals and Water Services.

- (a) Sewer lateral and/or water service trenches through roads, shoulders, parking areas and driveways in sections allowing excavated material backfill shall be backfilled with granular material within one half-to-one slopes extending downward and outward from the edges of gravel and paved areas or from the back of curb and gutter.

B. Granular Backfill. (Within existing or proposed paved or graveled areas.)

- 1. Granular backfill, in accordance with Table 37 of Section 6.43.4 of the "Standard Specifications", shall be used to backfill trenches located within existing or proposed (new) paved or graveled areas or as shown on the Plans, except as provided for below. The cost of furnishing and placing granular backfill and disposing of excavated material shall be included in the unit price(s) bid for utilities.

- a. If excavated material is suitable for use as granular backfill, trenches shall be backfilled with suitable excavated granular material when so ordered by the Engineer.

- (1) Excavated sand material may be used as granular backfill.

b. State Highways.

- (1) Granular backfill placed within state highway right-of-ways shall conform to Section 209 of the "State Specifications".

2. Sewer Laterals and Water Services.

- a. Sewer lateral and/or water service trenches through lawn or terrace areas in sections requiring granular backfill may be backfilled with excavated material outside of one half-to-one slopes extending downward and outward from the edges of pavement and gravel areas or from the back of curb and gutter.

3. Backfill in Waterways.

- a. Materials used to backfill trenches within waterways shall be washed gravel backfill free of excessive fines. Materials conforming to Tables 32 and 33 (bedding materials) of Section 6.43.2 of the "Standard Specifications" shall be generally considered acceptable under this classification.

C. Slurry Backfill.

1. "Slurry" aggregate material shall be used to backfill trenches as shown on the Plans and as specified in Paragraph 2 below.

- a. The slurry backfill material must be prepared in the quantities noted below. The material shall be placed in a clean cement mixer truck and thoroughly mixed.

1,350 lbs. Sand  
775 lbs. #1 Stone (1 inch)  
1,150 lbs. #2 Stone (2 inch)  
25 gals. (+0 to -0.5 gal.) Water per cubic yard

- b. No additional water will be allowed. The above weights are damp weights.
- c. Just prior to placing the slurry, the mixer shall be run at mixing speed for one full minute to ensure an even mixture.
- d. Compaction of slurry backfill is not required, however, the Engineer may order mechanical vibration in areas difficult to backfill.

2. State Highways.

- a. Trenches located under the traveled roadway of State Highways shall be backfilled with “slurry” material between points located 5 feet beyond the edge of shoulders or the back of curb and gutter.
- b. Trenches located adjacent to and outside of the roadway limits indicated in Paragraph C.3.a. above shall be backfilled with granular backfill to the ditch line.

D. Consolidation.

1. Amend Section 2.6.14 of the “Standard Specifications” to read in part:

“All granular and excavated material backfill shall be consolidated through mechanical compaction by means of a backhoe boom-mounted compactor. Either a vibratory compactor or compaction wheel is acceptable if it can meet the densities specified below. The backhoe used for compaction shall be equal in reach to the backhoe used for excavating the trench; i.e., capable of reaching the bottom of the trench with no additional shelf excavation. Backfill shall be compacted in eighteen (18) inch maximum lifts, before compaction, unless noted otherwise below, except that the first lift shall be two (2) feet in depth. The Contractor shall take all precautions necessary to protect utilities from being damaged during backfilling and compaction operations.”

- a. Granular backfill shall be compacted to a minimum of 95% Standard Proctor Density.
- b. Excavated material backfill shall be compacted to a density equal to 100% of the density of the undisturbed material in adjacent trench walls.
- c. Topsoil shall not be compacted.
- d. State Highways.
  - (1) Backfill placed within state highway right-of-ways shall be compacted in 12” maximum lifts, except that the first lift shall be two (2) feet in depth.

2. If there is a question as to whether or not the specified density has been achieved, a soil testing firm selected by the Engineer will be brought in to determine the backfill density. The cost of this testing will be paid for by the Developer if the test results are satisfactory, however, if the backfill is

found to be inadequately compacted, the Contractor shall pay all testing costs.

3. If the Contractor desires to use alternate compaction equipment or backfill depths greater than those specified, documentation must be submitted to the Engineer substantiating the adequacy of the proposed compaction method. Alternate compaction methods shall not be used unless approved by the Engineer. The Engineer may require density testing by an approved soil testing firm to field verify backfill densities. All compaction testing costs for field verifying alternate compaction methods shall be paid for by the Contractor.

E. Surplus Excavated Material.

1. Existing Roads and Easements.

- a. Surplus excavated material shall be disposed of by the Contractor at his own option and cost in accordance with Section 2.2.11 of the "Standard Specifications" and these Special Provisions.
- b. The Contractor shall be responsible for obtaining the use of all "off site" disposal sites and all necessary permits, unless the site is designated by the Owner or Developer. Disposal sites shall be kept neat, leveled, and graded to drain. Material lost from trucks in transit shall be cleaned up immediately. Material not properly cleaned up will be removed by the Owner or Developer and the cost thereof charged to the Contractor.

2. New Subdivisions.

- a. Surplus excavated material shall be disposed of by the Contractor "on site" at the location(s) designated by the Developer in accordance with Section 2.2.11 of the "Standard Specifications" and these Special Provisions.
  - b. On site disposal sites shall be kept neat, leveled and graded to drain. Stockpiles shall be graded at maximum 4:1 sideslopes to allow for mowing of grasses and weeds by tractor or riding mower.
3. Surplus excavated materials shall not be deposited within floodplains, marshes or other wetland areas.

## 800. SURFACE REPLACEMENT AND SITE RESTORATION

### A. General Replacement.

1. The provisions of Sections 2.6.11 and 2.7.2 of the "Standard Specifications" are modified as follows:
  - a. The Contractor shall replace or restore, unless specified otherwise, any sidewalk, driveway, curb, gutter, shoulder, pavement, culvert, lawn, ditch, fence, sign, mailbox or other property damaged by him at his own cost. Minimum requirements for restoration and replacement shall be in accordance with the applicable sections of these Special Provisions or as directed by the Engineer.
    - (1) The Contractor is specifically directed to replace all mailboxes and street signs removed or damaged by his operations.
  - b. Damaged concrete pavements and driveways, sidewalks and curb and gutter shall be removed and replaced to existing joints unless otherwise allowed by the Engineer.
  - c. Restoration of pavements damaged by normal truck hauling operations; i.e., hauling within approved weight and speed limits and exercising reasonable care while starting, stopping or turning vehicles, will not be the responsibility of the Contractor. This provision does not apply to pavement damaged by truck wheels during loading or unloading operations.
2. Mailbox Relocation.
  - a. The Contractor shall relocate all mailboxes, including those not damaged or disturbed by his operations, to meet U.S. Postal Service Requirements, a copy of which is included in the Appendix. The cost of this work shall be included in the unit prices bid for other items.
3. Correction of Minor Replacement Problems.
  - a. Any minor construction related replacement or restoration problems, brought to the Contractor's attention, shall be corrected within 24 hours or this work may be done by the Owner's personnel with the cost deducted from monies owed the Contractor.

- b. Minor problems might include: driveway access restrictions caused by rutting, settling or other maintenance problems, damaged or removed mailboxes, blockage of surface drainage and erosion problems.

B. Culverts.

- 1. Amend Section 2.1.2 of the “Standard Specifications” to include the following:

“The Contractor shall remove and protect culverts conflicting with the utility work and shall replace the culverts to their original line and grade upon completion of utility installation in the immediate area.”

C. Survey Monuments.

- 1. Contractor’s attention is directed to Section 2.1.4 of the “Standard Specifications” requiring the Contractor to protect survey monuments, excluding those monuments within or adjacent to trench excavations or road grading limits, from being damaged. The Contractor shall notify the Engineer at least 48 hours prior to removing or disturbing any survey monuments within his construction limits, to allow the Engineer to tie in the location of these monuments prior to their removal.

- a. The Engineer will replace all damaged monuments previously tied in as stated above.

- b. All damaged survey monuments shall be replaced by a Registered Land Surveyor at the Contractor’s expense if the monument is:

- (1) Located within the construction limits, but not tied in by the Engineer due to the Contractor’s failure to notify the Engineer as stated above; or

- (2) Damaged due to careless operations outside of the excavation limits.

- 2. Section Corner Monuments.

- a. The Contractor shall remove and salvage all section corner monuments and/or ties within trench excavations. The Engineer will tie in these monuments prior to their removal and will be responsible for their replacement. The Contractor shall confirm that monuments have been tied in prior to removal. All such monuments not tied in shall be replaced by a Registered Land Surveyor at the Contractor’s expense.

- b. Notify the County Surveyor prior to removing any section corner monument.

D. Pavement Protection.

1. The Contractor shall take all precautions necessary to protect road pavements, including shoulders, from being damaged. Sheathing and bracing or the use of a portable trench box, if required, shall be in accordance with Chapter 2.3.0. of the "Standard Specifications".
2. Backfill or excavated material spilled or tracked onto pavements or shoulders shall be removed at the completion of each working day or as directed by the Engineer.
  - a. Any such materials interfering with traffic shall immediately be swept off with power brooming equipment.
  - b. Cleaning using a front-end loader is not acceptable.

E. Pavement Replacement.

1. See Section 810 of these Special Provisions.

F. Lawn Replacement.

1. See Section 820 of these Special Provisions.

G. Field Restoration.

1. All trenches crossing fields (croplands) shall be restored as follows:
  - a. Strip all topsoil from over trenches, stockpile within easement areas and replace over trenches after backfill materials have been compacted.

H. Waterway Restoration.

1. Lawn areas adjacent to waterways (creeks or drainage ditches), including stream banks, shall be restored immediately upon completion of trench backfilling and compaction operations.
2. Lawn restoration shall include topsoil, fertilizer, seed, mulch and erosion control fabric as specified in these Special Provisions.

3. Restoration of banks shall include placing an erosion control fabric over all seeded areas. The fabric shall be Erosion Control Fabric as manufactured by Geotextile Systems, Inc., Pewaukee, Wisconsin, or equal. The fabric shall be installed in accordance with the manufacturer's specifications.
4. Care shall be taken during construction to minimize erosion into waterways. Temporary erosion control measures including bales or silt fences shall be used to prevent sediment laden runoff from entering waterways.

I. Clearing and Grubbing. [Existing Developed Areas]

1. Amend Sections 2.1.3 and 2.2.15 of the "Standard Specifications" to read in part:

"The Contractor shall cut down and remove all trees, stumps, bushes, shrubs and brush interfering with construction of utilities as shown on the Plans and/or as directed by the Engineer. No trees, unless marked on the Plans with an "X" for removal, may be removed without the Engineer's approval. The Engineer will field verify and mark all trees to be removed from within easement areas."

2. Tree Trimming and Protection.

- a. The Contractor shall carefully trim tree limbs or branches interfering with work operations, from trees to be saved, as approved by the Engineer. Such trimming shall be performed in accordance with generally accepted horticultural practices. The cost of tree trimming shall be included in the unit price(s) bid for utilities.
- b. The Contractor's attention is directed to Section 2.1.3 of the "Standard Specifications" requiring the Contractor to neatly cut perpendicular to the direction of growth all tree roots one inch or greater in diameter.
- c. Trees and shrubs to be preserved shall be protected from scarring or other injury. The Contractor shall compensate the Owner for damage to protected trees caused by the Contractor's operations.

J. Field Tile.

1. Field tile lines crossed and damaged by trenches shall be replaced with polyvinyl chloride (PVC) sewer pipe meeting the requirements of ASTM D-3034, SDR-35, with rubber gasket joints. The PVC pipe shall extend

for a minimum distance of 2 feet outside of the edge of the trench wall. The tile to PVC pipe connection shall be made with compatible fittings, adapters or encased in concrete. The size of the new pipe shall be equal to or greater than the tile line being replaced.

- a. Damaged field tile shall be repaired the same day as the damage occurs so that the flow of water will not be unreasonably restricted.
- b. Damaged tile shall be connected to new storm sewers wherever possible. The cost of tile connections shall be incidental to the cost of new storm sewers.

2. Active Tile.

- a. Active field tile lines (draining offsite areas) shall be maintained so that they continue to drain. Reconstruct or relay [at a new location(s)] as required.

K. Trench Surface Maintenance.

- 1. The Contractor's attention is directed to Section 2.6.16 of the "Standard Specifications", requiring the Contractor to maintain trench surfaces for the duration of the Contract and for one (1) year after acceptance.

810. PAVEMENT REPLACEMENT (EXISTING PAVEMENTS – EXCLUDING NEW SUBDIVISION ROADS)

A. Saw-Cutting Pavements.

- 1. All concrete and asphalt pavements, shoulders and driveways shall be saw-cut to a minimum depth of three (3) inches prior to being shattered and removed. Where concrete pavements are covered with an asphalt overlay, both the asphalt and concrete shall be saw-cut. Pavements shall be saw-cut in neat straight lines perpendicular or parallel to the road centerline to produce a clean joint for pavement restoration. If the saw-cut edge is damaged during construction, the Contractor shall saw-cut the pavement again immediately prior to paving. The cost of saw-cutting shall be included in the unit prices bid for other items.
  - a. All concrete and asphalt pavements within state highway right-of-ways shall be saw-cut full depth prior to being shattered and removed.

2. Concrete Pavement.

- a. If the saw-cut edge of a trench through a concrete pavement outside of state highway right-of-ways is closer than 4 feet to an existing joint or pavement edge, the pavement shall be removed and replaced to such joint or pavement edge.
- b. State Highways.
  - (1) A minimum width of 10 feet of concrete pavement shall be removed and replaced on state highways.
  - (2) If the saw-cut edge of a trench through a concrete pavement within a state highway right-of-way is closer than 10 feet to an existing joint or pavement edge, the pavement shall be removed and replaced to such joint or pavement edge.

B. Temporary Surfacing.

- 1. All trenches in asphaltic shoulders, driveways and pavements shall be temporarily surfaced with crushed aggregate base course equal in thickness to the total thickness of gravel base course and asphaltic pavement.
- 2. All trenches in concrete driveways and pavements shall be temporarily surfaced with crushed aggregate base course equal in thickness to the total thickness of gravel base course and concrete pavement.
- 3. The temporary gravel surface shall be in place at the end of the working day and shall be maintained until the asphaltic surface or concrete pavement is placed.
- 4. Cold Patch.
  - a. State and County Roads.
    - (1) The Contractor shall temporarily restore damaged pavements on state and county highways with a minimum of 3 inches of approved well compacted asphaltic cold patch or temporary asphaltic hot mix within seven (7) days after backfilling trenches. The Contractor has the option of placing the permanent pavement replacement in place of the temporary pavement within the same time period.
    - (2) The Contractor shall be responsible for maintaining temporary pavement replacement.

- (3) The temporary patch shall be replaced with the permanent pavement at the completion of all trenching work and/or when weather conditions permit.
  - b. Village Streets. (If Specified in Special Conditions.)
    - (1) If the Contractor cannot complete permanent asphaltic pavement replacement work within the year that utility work was completed, due to weather conditions or scheduling delays, he shall temporarily restore damaged pavements with a minimum of 2 inches of approved well compacted asphaltic cold patch or temporary asphaltic hot mix.
    - (2) The temporary patch shall be placed as soon as practical after completing utility work. The temporary patch shall be removed and the permanent pavement replacement work shall be completed as soon as weather conditions permit, but no later than the following June 1<sup>st</sup>.
    - (3) The Contractor shall be responsible for maintaining temporary pavement replacement.
- C. Damaged shoulder, pavement, driveway, and parking areas shall be replaced "in kind"; except that where the existing pavement thickness is less than the following minimum pavement thickness(es), the minimum pavement section (specified below) shall be placed:
  1. Gravel Roads and Road Shoulders.
    - a. A minimum of 10 inches of crushed aggregate base course shall be placed over gravel roads.
    - b. A minimum of 8 inches of crushed aggregate base course shall be placed over gravel road shoulders.
  2. Asphaltic Pavements.
    - a. Existing asphaltic pavements shall be replaced with a minimum of 10 inches of crushed aggregate base course and 4 inches of asphaltic concrete pavement.
      - (1) The pavement shall consist of a minimum 1-3/4 inch thick surface course and a minimum 2-1/4 inch thick binder course.

3. New Subdivision Roads.
  - a. New subdivision roads may be graded to subgrade, by others, prior to utility construction.
  - b. The Utility Contractor shall restore the subgrade to its existing condition upon completion of utility construction.
4. Concrete Pavements.
  - a. Existing concrete pavements shall be replaced with a minimum of 7 inches of non-reinforced concrete pavement and 6 inches of crushed aggregate base course.
  - b. Refer to Paragraph 810.A.2.b of these Special Provisions for minimum widths of pavement removal on state highways.
5. Concrete Base and Asphaltic Overlay.
  - a. Restoration of pavements consisting of a concrete base and asphaltic surface or overlay may be “in-kind” or with full depth asphaltic concrete pavement.
    - (1) Pavement replacement “in kind” shall be installed with a 3-day high-early-strength concrete and asphaltic overlay unless an 8-hour special-high-early-strength concrete is specified in the Special Conditions.
    - (2) Full depth asphaltic concrete pavement shall be installed with 4 equal lifts with a maximum of 2 lifts installed per day.
6. Driveways and Parking Areas.
  - a. Gravel Surface.
    - (1) Existing gravel driveways and parking areas shall be replaced with a minimum of 9 inches of crushed aggregate base course.
    - (2) Base course material shall match the existing material; example, place limestone material over existing limestone drives.

b. Asphaltic Pavement.

- (1) Existing asphaltic driveways and parking areas shall be replaced with the following minimum thicknesses:
  - (a) Residential - 6" base and 3" pavement (1-1/2" and 1-1/2").
  - (b) Commercial - 10" base and 4" pavement (1-1/2" and 2-1/2").
  - (c) Industrial - 12" base and 4" pavement (1-1/2" and 2-1/2").

c. Concrete Pavement.

- (1) Existing concrete drives shall be replaced with a minimum of 6 inches (7 inches minimum over business or industrial drives) of non-reinforced concrete pavement and 6 inches of crushed aggregate base course. Concrete drives shall be reinforced if the existing drive has reinforcing.

d. New or Reconstructed Driveways (Road Construction Projects).

- (1) All new driveways shall have either asphalt or concrete surfaces.
- (2) All existing gravel driveways located within the construction limits of roadway construction projects shall be replaced with either asphaltic or concrete surfaces.

D. Base Aggregate Dense.

1. Base aggregate dense shall comply with Section 305 of the "State Specifications", as modified below.
  - a. The top layer of base (4 inches minimum thickness) shall be base aggregate dense 1-1/4-inch and the lower layer(s) shall be either base aggregate dense 3-inch (6 inches minimum thickness) or base aggregate dense 1-1/4-inch (4 inches minimum thickness). Note: If the total base thickness is less than 10 inches, then only base aggregate dense 1-1/4-inch may be used.
  - (1) The base shall be constructed in two or more layers in accordance with Section 305.3 of the State Specifications.

- b. Base material placed over driveways shall be base aggregate dense 1-1/4-inch.
  - c. The top 3 inches of base material placed over road shoulder areas shall be base aggregate dense 3/4-inch and the remainder shall be either base aggregate dense 3/4-inch or base aggregate dense 1-1/4-inch.
- 2. Base material, including shoulders and drives, shall be compacted using rolling or vibratory type equipment unless otherwise approved by the Engineer.

E. Asphaltic Concrete Pavement.

- 1. Asphaltic concrete pavement shall comply with Section 1450 of these "Special Provisions". The pavement mix shall be Type E-0.3 for roadways and either Type E-0.3 or Asphaltic Surface for driveways and parking areas.

F. Concrete Pavement.

- 1. Concrete pavement shall comply with Section 415 of the "State Specifications", as modified below:
  - a. All concrete shall be Grade C, air-entrained, 7-bag mix with a 28-day compressive strength of 4000 psi, as specified in Subsection 501.5 of the "State Specifications", and shall be ready-mixed.
  - b. High Early Strength Mixes. (Specified in Special Conditions.)
    - (1) All concrete shall be Air-Entrained High-Early-Strength Concrete, Grade C, 7-bag mix, with a 28-day compressive strength of 4000 psi, as specified in Subsection 501.5 of the "State Specifications", and shall be ready-mixed.
    - (2) All concrete shall be special-high-early-strength concrete (3000 psi within 8 hours), as specified in Subsection 416.2.5 of the "State Specifications", and shall be ready-mixed.
  - c. All concrete shall receive a brush finish.
  - d. Concrete shall be cured by the Impervious Coating Method in accordance with Subsection 415.5.10.2.

- e. The pavement shall be opened to traffic in accordance with Subsection 415.5.15.
- f. High Early Strength Mixes. (Specified in Special Conditions.)
  - (1) The pavement shall be opened to traffic within 3 to 4 days after pouring in accordance with Subsection 415.5.15.
  - (2) The pavement shall be opened to traffic the same day as poured, if possible, but not sooner than 8 hours after placing.

2. Pavement Ties.

- a. All joints between existing and new pavements shall be constructed using tie bars conforming to Subsection 505.2.6 of the "State Specifications" and the Standard Detail Drawings included in the Appendix.
  - (1) Anchor transverse joints with 1-1/4" x 18" dowel bars at 15" maximum spacing as shown on the detail.
  - (2) Anchor longitudinal joints with No. 4 x 24" ties bars at 30" C-C spacing.

3. Test Specimens.

- a. The Contractor shall take two (2) representative concrete samples for 7 day and 28 day compression testing from each day's concrete mix.
- b. The Contractor shall field cure, care for, and ship the test cylinders to the testing laboratory. Test results shall be forwarded to the Engineer. All testing costs shall be paid for by the Contractor.

G. Tack Coat.

- 1. The Contractor shall apply a tack coat over existing pavements prior to placing the asphaltic concrete pavement/overlay.
- 2. Tack Coat.
  - a. Tack coat material shall be MS-2 asphalt emulsion diluted with an equal amount of water and applied at a rate of 0.05 to 0.15 gallons per square yard or as directed by the Engineer.

H. Pavement Restoration Timetable.

1. Asphaltic pavement shall be placed in accordance with the requirements of Subsection 405.3.1 and concrete pavement shall be placed in accordance with the requirements of Subsection 415.5.13 of the "State Specifications".
2. Weather permitting, pavement replacement shall be completed within 30 calendar days after completing utility construction work.
3. Pavement replacement work in areas constructed during winter months shall be completed by June 1st of that year. All pavement replacement in areas constructed after June 1st shall be completed in accordance with Paragraphs 1 and 2, above.
4. The Contractor shall be responsible for the pavement replacement for one year after receiving approval of the final resurfacing per Village Ordinance.

820. LAWN REPLACEMENT (EXISTING DEVELOPED AREAS – EXCLUDING NEW SUBDIVISIONS)

A. All damaged or destroyed grass and terrace areas shall be restored with four (4) inches minimum of topsoil and shall be fertilized, seeded and mulched as specified below and as directed by the Engineer.

1. Topsoil.
  - a. Topsoil shall be imported material, furnished by the Contractor, consisting of materials as specified in Subsection 625.2.1 of the "State Specifications".
  - b. Salvaged topsoil may be used to restore lawns only if the material is screened and approved by the Village.
  - c. Topsoil and salvaged topsoil shall be pulverized (completely broken down to remove all clods and lumps). The material shall be free of rocks, twigs and other foreign material, 100% shall pass a one-inch sieve and at least 90% shall pass the No. 10 sieve (0.08 inch).
  - d. Topsoil and salvaged topsoil shall be placed in accordance with Paragraph 625.3.3. of the "State Specifications".

2. Fertilizer.

- a. Topsoil shall be fertilized with fertilizer complying with Section 629 of the "State Specifications".
- b. Apply Type A fertilizer at 7 pounds per 1,000 square feet.

3. Seeding.

a. Lawn Type Turf.

- (1) All lawn areas restored with topsoil, unless shown otherwise on the Plans, shall be seeded with grass seed meeting the requirements of Subsection 630.2.1.5.1.1.1 (Seed Mixture No. 40) of the "State Specifications", except that seed shall be distributed at a rate of four (4) pounds per 1,000 square feet.

b. Rural Type Turf.

- (1) All rural grass areas, except those areas where a lawn type turf is required and unless shown otherwise on the Plans, shall be seeded with grass seed meeting the requirements of Subsection 630.2.1.5.1.1.1 (Seed Mixture No. 20) of the "State Specifications", except that seed shall be distributed at a rate of five (5) pounds per 1,000 square feet.

4. Mulching.

- a. All seeded areas shall be mulched in accordance with the requirements of Section 627 of the "State Specifications".
- b. The Contractor may place mulch using Method A, B or C of Subsection 627.3.

B. Sodding.

- 1. The Contractor shall place sod over all damaged grass, lawn and terrace areas as shown on the Plans, or as directed by the Village.
- 2. Sodding shall comply with Section 631 of the "State Specifications", as amended below:

a. Materials.

- (1) Sod shall consist of permanent grasses, indigenous to the general locality where it is to be used and practically free from weeds or undesirable grasses.
- (2) The Contractor shall submit a certificate to the Engineer before installation detailing the sod grass composition and place of origin.
- (3) Sod shall be cut in uniform strips approximately 18" x 72", be 3/4" thick or more and have grass 2" tall.

b. Areas to be sodded shall be covered with 4 inches minimum of topsoil and fertilized in accordance with Subsections 820.A.1 and 820.A.2 of these Special Provisions.

c. All sodded areas shall be kept thoroughly moist by watering or sprinkling, when rainfall is deficient, for a minimum period of ten days or until final project completion.

C. Erosion Control Mat.

1. See Subsection 650.I of these Special Provisions.

D. Lawn Restoration Timetable.

1. Weather permitting, lawn replacement shall be completed within 30 calendar days after all other work has been completed. Seeding may be done at any time during the growing season when soil conditions are suitable.
2. All lawn replacement work in areas constructed during winter months shall be completed by May 15th of that year. All lawn replacement work in areas constructed after May 15th shall be completed in accordance with Paragraph 1 above.

900. TRAFFIC MAINTENANCE

A. Through Traffic Access. (Collector or Arterial Streets.)

1. The Contractor shall maintain a minimum of one lane of traffic on major collector or arterial streets (as defined by the Village of East Troy) at all times. Refer to the Special Conditions for street classifications. Roads shall be maintained in a safe condition throughout the duration of the project. The Contractor shall take all precautions necessary to safely warn

the public of the probable increased danger to travel due to construction of the Work.

- a. All streets shall be open to two-way traffic after working hours and all day on weekends and holidays.
- b. The Contractor shall at all times conduct his work in a manner to minimize obstruction to local traffic.

B. Local Traffic Access. (Local Streets.)

1. The Contractor may close minor local streets (as defined by the Village of East Troy) to through traffic, allowing local traffic only, during working hours. Refer to the Special Conditions for street classifications. The Contractor shall at all times conduct his work in a manner to minimize obstruction to local traffic. Roads shall be maintained in a safe condition throughout the duration of the project. The Contractor shall take all precautions necessary to safely warn the public of the probable increased danger to travel due to construction of the work.
  - a. All streets shall be open to local traffic after working hours and all day on weekends and holidays.
  - b. The Contractor shall notify police and fire departments prior to closing any street to through traffic.
  - c. The Contractor shall provide access for garbage collection and mail delivery on those streets closed to through traffic by his construction activities for the duration of the project.

C. Driveway Access.

1. If driveway access is to be blocked, then it shall be the Contractor's responsibility to notify all affected property owners prior to closing that section of the street to traffic.
2. The Contractor shall construct temporary ramps at all driveways to provide access during road construction.
3. The Contractor shall provide full-time access to residences of handicapped persons, nursing and retirement homes, hospitals and other facilities as directed by the Engineer, unless other satisfactory arrangements are approved.

4. Access to Businesses and Industries.

- a. The Contractor shall provide full-time access to businesses and industries unless other satisfactory arrangements are approved. Access may be provided by constructing temporary drives and/or by placing steel plates over new concrete gutters.

D. Mail Delivery.

1. The Contractor is responsible for insuring that mail can be delivered to properties affected by his work operations in a reasonable and timely manner.
2. If the Contractor's operations unduly restrict or prohibit mail delivery, he shall take measures to provide alternate method(s) for mail pick-up. Alternate methods may include:
  - a. Temporarily relocating mailboxes removed by his operations.
  - b. Providing alternate/multiple delivery and collection boxes at a central location.
3. Alternate mail delivery methods shall be coordinated with both the post office and all affected properties.

E. Detouring Traffic (If Specified in Special Conditions).

1. The Contractor may detour traffic from streets as specified in the Special Conditions. Traffic shall be detoured along the routes specified in the Special Conditions.
2. Traffic may be detoured only during those periods of the working day that are deemed necessary by the Contractor, Engineer and Owner for prosecution of the work unless stated otherwise in the Special Conditions. Streets shall be open to two-way traffic during non-working hours, weekends, holidays and during periods of work not included above. Work shall be scheduled to keep streets open to two-way traffic to the maximum extent possible.
3. The Contractor shall be responsible for furnishing, installing and maintaining all barricades and signs required for detouring traffic. The detour route and signing shall be coordinated with and approved by the Village.
4. The Contractor shall provide local traffic access on streets closed to through traffic by detours. See Subsection 900.B. above.

F. Snow Removal.

1. The Contractor shall coordinate his activities with the appropriate agency responsible for snow removal during periods of inclement weather.

G. Signing, Barricades and Flagmen.

1. Whenever the Contractor's activities obstruct through traffic, there shall be sufficient flagmen on duty to guide the traffic, and the Contractor shall furnish and install all temporary signing and barricades required to safely direct the traveling public around the obstructed area.
  - a. As a minimum, suitable barriers shall be erected and maintained at each end of the obstructed section of roadway and at all affected roadway intersections.
  - b. Traffic control shall be done in accordance with the latest version of Part 6, Temporary Traffic Control of the FHWA "Manual on Uniform Traffic Control Devices", and the Wisconsin Supplement; the Traffic Control Plan (if shown on the Plans or in the Appendix) and Section 643 of the "State Specifications".
  - c. Whenever traffic on state or county highways is obstructed, the Contractor shall provide a minimum of two (2) flagmen to direct traffic at each separate work location.

1000. CONSTRUCTION IN STATE, COUNTY, AND TOWN HIGHWAYS

A. Highway Permits.

1. Construction within the right-of-ways of State, County, and Town Highways shall be governed by the applicable permits and the appropriate sections of the Specifications. Said permit(s) for this construction have been obtained for the Contractor by the Owner and are available for review and/or are included in the Appendix.
2. The Contractor shall familiarize himself with all requirements of said permits and general requirements of these agencies. All costs for, but not limited to, items such as flagmen, backfill in casing pipes, supervision and special insurance required by these agencies shall be considered to be included in the unit prices bid for utilities. Additional payments for items required, but omitted by the Contractor in his bid preparation, will not be considered by the Owner.

- a. A standard State of Wisconsin highway permit form is included in the Appendix in order that the Contractor may familiarize himself with the general requirements of this State agency.
  - (1) The WisDOT shall be notified at least 24 hours prior to the installation of erosion control and storm water management measures within State highway right-of-ways. It is the Contractor's responsibility to ensure that the WisDOT has been notified prior to commencing work on State highways. Contact Jeff Volz, District Permits Coordinator at 262-521-5344
  - (2) The WisDOT shall also be notified after the project has been completed and lawn areas stabilized.
  - (3) Open-Cut Work Restrictions.
    - (a) Open-cuts in travel lanes within state highway right-of-ways will not be allowed between December 1st and April 15th, nor during times when asphaltic hot mix is not available.

#### 1201. CLEARING AND GRUBBING

- A. Clearing and grubbing shall comply with Section 201 of the "State Specifications", as amended herein.
- B. Measurement and Payment.
  - 1. All trees to be removed are shown on the Plans and/or will be field marked by the Engineer.
    - a. The diameter of trees scheduled for removal shall be 1/3 of the circumference measured 4 1/2 feet above the existing ground level.
    - b. Amend Subsection 201.3.2 of the "State Specifications" to read in part:

"Only those trees and stumps having a diameter of six (6) inches or greater will be measured for payment. The cost of removing all other trees, stumps, bushes and brush shall be included in the unit price bid for excavation."

C. Tree Trimming.

1. The Contractor shall carefully trim limbs or branches overhanging the road, of trees to be preserved, as directed by the Engineer. Such trimming shall be performed in accordance with generally accepted horticultural practices and all cut surfaces one inch or more in diameter shall be painted with asphalt base tree paint or other acceptable material. All costs associated with tree trimming shall be included in the price(s) bid for excavation.

D. Tree Protection.

1. Trees and shrubs to be preserved shall be protected from scarring or other injury during grading operations. Excavation operations around trees to be preserved shall not disturb the original ground around the trees within a distance equal to twice the diameter of the tree, one foot minimum. Exposed roots resulting from excavation shall be cleanly cut and covered with humus-bearing soil. The Contractor shall compensate the Owner for damage to protected trees caused by the Contractor's operations.

E. Disposal of Debris.

1. Stumps, roots, brush, waste logs and limbs, timber tops and debris resulting from clearing and grubbing shall be disposed of by the Contractor at his own option and cost except that burning or burial within the street right-of-way and/or project site is prohibited.
2. Disposal of diseased material shall be in accordance with all local, state and federal regulations.

1201.1. TREE ROOT REMOVAL

- A. This work shall consist of removing tree roots from within the limits of excavation, including 6 to 12 inches behind proposed curb and gutter and from 6 to 12 inches beyond the edges of the proposed sidewalk. Remove tree roots to a depth of not less than 6 inches below the concrete base or finished ground grade.

B. Construction Method.

1. Cut roots utilizing mechanical root cutting equipment or by a hand method. Roots shall be cleanly cut in a vertical direction with as little damage to remaining roots as possible. Do not cut roots using backhoes or endloaders.
2. Cover exposed roots with burlap, straw or humus-bearing soil and keep moist until backfilling is completed.

## 1204. REMOVING MISCELLANEOUS STRUCTURES

### 1204.1. REMOVING PAVEMENT

- A. Removing asphaltic and concrete pavements shall consist of removing asphaltic and concrete pavement, including asphaltic and concrete drives, as shown on the Plans and as directed by the Engineer. This work shall be done in accordance with Section 204 of the “State Specifications”.
- B. Saw-Cutting Pavements.
  - 1. All concrete and asphalt pavements (including butt joints), shoulders and driveways shall be saw-cut to a minimum depth of three (3) inches prior to being shattered and removed. Where concrete pavements are covered with an asphalt overlay, both the asphalt and concrete shall be saw-cut. Pavements shall be saw-cut in neat straight lines, at right angles to the street or drive, to produce a clean joint for pavement restoration. If the saw-cut edge is damaged during construction, the Contractor shall saw-cut the pavement again immediately prior to paving.
    - a. All concrete and asphalt pavements within state highway right-of-ways shall be saw-cut full depth prior to being shattered and removed.
- C. Any electrical wiring contained in concrete removal shall be cut to an adequate length to provide splicing of wire for new concrete pavement and coordinated with the Owner’s electrician.

### 1204.2. REMOVING CONCRETE STRUCTURES

- A. Removal of concrete curb and gutter, sidewalk and steps shall include removing and disposing of all concrete sections shown on the Plans and as directed by the Engineer.
- B. Concrete removal work shall comply with Section 204 of the “State Specifications”.
- C. Concrete structures shall be removed to existing joints or as marked in the field. If saw-cutting is necessary, it shall be done in accordance with Section 1204.1 of these Special Provisions.

### 1204.3. DISPOSAL OF PAVEMENT AND CONCRETE STRUCTURES

- A. All removed pavement material and miscellaneous structures, including curb and gutter and sidewalk shall be disposed of by the Contractor, at his option and cost, and in places provided by him outside of the right-of-way and/or project site.
- B. All other miscellaneous structures and materials shall be disposed of in accordance with Subsections 203.2.3 and 204.2.3 of the "State Specifications".

### 1205. ROADWAY AND DRAINAGE EXCAVATION

#### 1205.1. COMMON EXCAVATION

- A. Common excavation shall include all roadway, site grading and drainage excavation necessary to complete this project, including pavement removal and disposal (if any) and topsoil removal and stockpiling, as specified herein and as shown on the Plans.
  - 1. The Contractor shall remove all topsoil from within the traveled roadway or as shown on the Plans. Remove all topsoil within 1:1 slopes extending downward and out from the edges of the base or subbase material.
- B. All excavation and grading work shall comply with the provisions of Sections 205 (Roadway and Drainage Excavation), 207 (Embankment), 211 (Preparing the Foundation), and 213 (Finishing Roadway) of the "State Specifications".
- C. Drainage During Construction.
  - 1. Drainage shall be provided during construction in accordance with Subsection 205.3.2 of the "State Specifications".
- D. Dust Control.
  - 1. The Contractor shall minimize the dispersion of dust from the subgrade during grading operations, including maintenance operations until acceptance of the work, by the application of water or other approved dust control materials.
- E. Topsoil Stockpile.
  - 1. The Contractor shall stockpile an adequate amount of satisfactory topsoil for spreading over excavated lawn and terrace areas.
  - 2. Refer to Section 1625 of these Special Provisions for additional topsoil requirements.

## 1205.2. EXCAVATION BELOW SUBGRADE (EBS)

- A. Deposits of frost-heave material, unstable silty soils, water-bearing soil, topsoil or other undesirable foundation materials shall be removed from the area within the roadway slopes to such depths as directed by the Engineer. This work shall be done in accordance with Subsection 205.3.4 of the "State Specifications".
  - 1. Remove unsuitable materials to a minimum depth of 12 inches below subgrade or as directed by the Engineer.
- B. Granular Backfill for Excavation Below Subgrade.
  - 1. Granular backfill for excavation below subgrade shall comply with Section 209 of the "State Specifications".
    - a. Pit run gravel will generally be acceptable as granular backfill.
    - b. Excavations below subgrade shall be filled with satisfactory materials, excavated from other sections of the project, if such materials are available.
- C. Stone Backfill to Stabilize Subgrade
  - 1. Stone backfill to stabilize subgrade, if required, shall comply with the following gradation requirements:

### 2 Inch Size (ASTM C-33 - Size No. 3)

<u>Sieve Sizes</u>	<u>Percentage Passing by Weight</u>
2-1/2 Inches	100
2 Inches	90 - 100
1-1/2 Inches	35 - 70
1 Inch	0 - 15
1/2 Inch	0 - 5

## 1205.3. SITE GRADING

- A. Site grading work shall be done in accordance with Sections 1205.1 (Unclassified Excavation), 1205.2 (Excavation Below Subgrade), 1205.5 (Disposal of Materials), 1207 (Embankments), 1208 (Borrow), 1625 (Topsoil and Salvaged Topsoil), and 1630 (Lawn Restoration) of these Special Provisions.
- B. Maximum Grading Slope (4:1).
  - 1. All site grading operations including topsoil stripping and/or stockpiling, utility construction, street construction, cutting, filling, or other miscellaneous earth moving operations that result in cut or fill slopes, shall leave those slopes in a smoothly graded surface with slopes not to exceed

4:1 to allow weed cutting by ordinary tractor mounted cutting equipment. Any exceptions to this standard must be explicitly approved by the Village before slopes are made.

- C. Site grading work shall include all work shown on the plans and specified in the Special Conditions.

#### 1205.4. DISPOSAL OF MATERIALS

- A. Surplus Excavated Material.

- 1. Road Reconstruction.

- a. Surplus excavated material shall be disposed of by the Contractor, at his own option and cost, and in places provided by him outside of the right-of-way.
    - b. The Contractor shall be responsible for obtaining the use of all “off site” disposal sites and all necessary permits, unless the site is designated by the Owner. Disposal sites shall be kept neat, leveled, and graded to drain. Material lost from trucks in transit shall be cleaned up immediately. Material not properly cleaned up will be removed by the Owner and the cost thereof charged to the Contractor.

- 2. New Subdivisions.

- a. Surplus excavated material, except pavement and concrete, shall be disposed of by the Contractor, at his cost, at the on site location(s) designated by the Owner.
      - (1) Dispose of excess salvaged topsoil near the back of lots where it won't interfere with future building or driveway construction. The Contractor is responsible for insuring that an adequate amount of salvaged topsoil is stockpiled to restore lawn areas.
    - b. The material shall be disposed of in a manner that will create a neat and trim appearance, and in a manner to neither create a nuisance nor cause pollution nor siltation of watercourses, streams, lakes and reservoirs. Disposal areas shall be leveled by the Contractor and graded to drain.

## 1207. CONSTRUCTION OF EMBANKMENTS

- A. The construction of embankments, including fills and subgrades, shall be in accordance with Section 207 of the “State Specifications”.
- B. Materials.
  - 1. Embankments and other fill areas shall be constructed with approved materials, obtained from roadway and drainage excavation, conforming to Subsection 207.2. Salvaged topsoil, sod, logs, brush, and other perishable material shall not be used in embankments.
- C. Standard Compaction.
  - 1. Fill areas and the finished earth subgrade in cut sections and below fill sections shall be compacted in accordance with Subsection 207.3.6.2 for Standard Compaction. Fill shall be placed and compacted in layers generally not exceeding eight (8) inches in thickness before compaction.
  - 2. Standard compaction shall consist of compacting each layer of the embankment or earth subgrade to the degree that no further appreciable consolidation is evidenced under the action of the compaction equipment.
  - 3. Compaction shall be performed by specialized compaction equipment unless the Engineer determines that routing of hauling and leveling equipment over the area to be compacted is satisfactory and sufficient.
  - 4. Specialized compaction equipment shall include tamping rollers, pneumatic-tire rollers, vibratory rollers or other approved compaction equipment.
- D. Special Compaction.
  - 1. Special compaction, if required, in the contract documents or by the Engineer, shall be done in accordance with Section 207.3.6.3 of the “State Specifications”, as modified below.
    - a. Compact the top three (3) feet of fills and the top 6 inches in cuts to 95% of the maximum dry density.
    - b. Compact fills below three (3) feet in thickness to 90% of the maximum dry density.
  - 2. Special compaction shall be monitored and tested by a geotechnical engineer.

E. Proofrolling.

1. Prior to placing granular subbase or base course material, the Contractor shall test the subgrade strength by proofrolling. Proofrolling shall involve running loaded trucks or scrapers over the entire roadway (pavement plus shoulders) width. Weak or soft spots in the subgrade shall be removed and backfilled with granular backfill material conforming with Subsection 1205.2.B of these Special Provisions.

1208. BORROW EXCAVATION

- A. Borrow excavation shall comply with the provisions of Section 208 of the "State Specifications".
1. The Contractor shall be responsible for furnishing, hauling and placing borrow excavation, including securing the necessary borrow pits.
  2. Borrow excavation shall meet the material requirements of Subsection 208.2.1 and shall be approved by the Engineer.

1210. SOIL STABILIZATION FABRIC

- A. This work shall consist of furnishing and placing a soil stabilization fabric over soft or unstable subgrades as directed by the Engineer.
- B. Installation.
1. The fabric shall be placed in accordance with Subsection 645.3.2 of the "State Specifications" and the following requirements.
  2. Clearing and grubbing operations shall be completed prior to placement of the fabric. Remove all sharp objects, tree stumps and large stones that could puncture the fabric.
  3. Place the fabric by rolling onto the soft subgrade, extending over firm soil for a minimum distance of 5 feet. Overlap fabric rolls from 2 to 4 feet as required by local soil conditions.
  4. Place the first layer of aggregate by backdumping from trucks and spread with a tracked bulldozer. Do not drive vehicles directly on the fabric. The first lift of subbase material shall be 8 inches minimum compacted thickness or as directed by the Engineer. Compact the subbase using vibratory rollers or other approved compaction equipment.

C. Subbase Material.

1. Subbase course material shall comply with Subsection 1205.2.C of these “Special Provisions”.

D. Fabric Material.

1. The fabric shall be Geotextile Fabric, Type SAS meeting the requirements of Subsection 645.2.2 of the “State Specifications” and the following minimum requirements.

<u>Test</u>	<u>Minimum Requirement</u>
Grab Tensile Strength	270 lb.
Puncture Strength	110 lb.
Mullen Burst	400 psi
Equivalent Opening Size	20

2. Acceptable fabric materials include: Mirafi 600X, Trevira 1135, Amoco 2006, Exxon GTF-300, Phillips “Supac 14NP”, Nicolon “HP 500”, or equal.

1211. PREPARING THE FOUNDATION

- A. Preparing the Foundation shall be done in accordance with the following provisions and Section 211 of the “State Specifications”.

B. Earth Subgrade. (With Rough Grading By Others.)

1. Preparation of earth subgrade shall include all work required to finish grade the road subgrade including preparation of the subgrade for curb and gutter, sidewalk and driveways.
2. Existing pavements and base courses will be removed by the Owner to approximate subgrade elevation. The Contractor shall be responsible for bringing the subgrade to grade in accordance with Subsection 211.4.2. This work includes the disposal of all surplus excavated materials.

C. Foundation for Asphaltic Surfacing. (Existing Unpaved Roads.)

1. Foundation for asphaltic surfacing shall include all work required to prepare the base course, including shoulders, for paving and not included as a separate bid item.

2. The Contractor shall scarify all existing road surfaces. Upon completion of the scarifying operations the Engineer will stake the roads for line and grade.
3. The Contractor shall fine grade and compact the road, adding base course material as required, to the finished base course grade.

1304. BASE AGGREGATE DENSE

A. Base aggregate dense shall be constructed in accordance with Section 305 of the "State Specifications", and the typical section(s) shown on the Plans. The Contractor shall furnish and place base course material as required to construct the base course to grade.

1. Moisture Content.

- a. Base course material shall have a maximum moisture content of seven (7) percent before being weighed. Moisture content in excess of 7 percent will be deducted from the measured weight. Moisture content will be expressed as a percent of dry weight.

B. Gradation.

1. Base aggregate dense shall conform to the following gradations; as specified in Subsection 305.2.2:

a. Top layer:

- (1) 1-1/4-inch (4" minimum thickness).

b. Lower layer(s):

- (1) 1-1/4-inch (4" minimum thickness per layer).
- (2) 3-inch (6" minimum thickness per layer).

c. Shoulders:

- (1) Top 3 to 6 inches - 3/4-inch.
- (2) Lower layers - 1-1/4-inch or 3-inch per 1.b. above.

C. Standard Compaction.

1. Base aggregate dense shall be compacted in accordance with Subsection 207.3.6.2 of the "State Specifications" for Standard Compaction, as modified below.
  - a. Base aggregate dense shall be placed and compacted in two (2) equal layers.
  - b. Moisture shall be added by tank wagon as required for maximum compaction.
  - c. Standard compaction shall consist of compacting each layer of the base course to the degree that no further appreciable consolidation is evidenced under the action of the compaction equipment.
  - d. Compaction shall be performed by specialized compaction equipment including tamping rollers, pneumatic-tire rollers, vibratory rollers or other approved compaction equipment.

D. Proofrolling.

1. Prior to placing asphaltic or concrete pavement, the Contractor shall test the base course strength by proofrolling. Proofrolling shall involve running loaded trucks or scrapers over the entire roadway (pavement plus shoulders) width. Weak or soft spots in the base course shall be removed, replaced with clean base aggregate dense, compacted in 6 inch maximum lifts and retested.

E. Dust Control.

1. The Contractor shall minimize the dispersion of dust from the base course, including shoulders, during construction and maintenance operations until after placement of the surface course.
2. Dust control shall be accomplished by the application of water or other approved dust control material as required by the Engineer.

1304.1. EXISTING GRAVEL DRIVEWAYS (ROAD RECONSTRUCTION PROJECTS)

- A. All existing gravel driveways being reconstructed shall be replaced with either asphaltic or concrete surfaces.
  1. See Subsection 1450.1.A.2 for asphaltic driveway thicknesses and Subsection 1602.A.4 for concrete driveway thicknesses.

#### 1308. BASE PATCHING

- A. The item of base patching shall comply with Section 308 of the “State Specifications”, as modified below.
  - 1. This work shall include the removal of either concrete pavement and/or asphaltic concrete pavement and construction of a base course of either portland cement concrete or asphaltic concrete pavement.
  - 2. The existing damaged pavement shall be saw-cut and removed as shown on the Plans or as directed by the Engineer.
  - 3. The underlying base and unsuitable subbase material shall be removed and replaced with crushed aggregate base course in accordance with Section 1304 of these Special Provisions.
  - 4. The asphaltic base course shall be constructed of an asphaltic mixture conforming to Section 1450 of these Special Provisions for binder course.
    - a. The asphaltic base course shall match the thickness of the existing pavement and shall be placed in 3 inch maximum lifts.

#### 1402. TACK COAT

- A. The Contractor shall apply a tack coat to the existing pavement prior to placing the asphaltic overlay or final lift of pavement. Tack coat shall comply with Section 402 of the “State Specifications”.
  - 1. Material.
    - a. Tack coat material shall be Type SS-1 asphalt emulsion, diluted with an equal amount of water.
  - 2. Application Rate.
    - a. The tack coat shall be spread at a rate of 0.05 to 0.15 gallons per square yard or as directed by the Engineer. The bid quantity was figured assuming an application rate of 0.10 gallons per square yard.
- B. Surface Preparation.
  - 1. The Contractor shall sweep the pavement area with a power broom to remove dust, dirt, clay or other objectionable material prior to placing the tack coat.

C. Crack Sealing.

1. The Contractor shall seal all cracks 1/8" or wider with A.C. or rubberized crack filler prior to placing the tack coat.
2. The Contractor shall sweep or blow out loose dirt, clay and other objectionable materials from cracks prior to filling them.

D. Protecting Structures.

1. Surfaces of all structures shall be protected from being spattered or marred by tack coating operations.

1409. CRACK SEALING (RUBBERIZED) OF ASPHALTIC PAVEMENT

A. Description. The work shall consist of routing, cleaning and filling of random cracks and existing transverse and longitudinal joints. Also the joint between the concrete curb and blacktop pavement.

B. The Contractor shall seal all cracks 1/4 inch or greater in width in the asphaltic surface course on streets shown in the Plans or listed in the Special Conditions.

1. Pavements shall be crack sealed in the spring, but no later than May 1st, if a cutback asphalt is used.

C. Material.

1. The material used must be a premium quality rubber asphalt joint sealer. The sealer must meet ASTM D 3405 specification for hot-pour rubber asphalt joint sealants and contain a minimum of 23% reclaimed rubber.

D. Equipment.

1. The router must be a minimum of 24 H.P. using star wheel carbide tipped router blades attached to a main cutting head. It must have in-line wheels and cutting head capable of following random cracks. It must have an automatic depth control to ensure consistent and accurate routing depths.
2. Air compressor will be required to maintain a minimum air pressure of 120 PSI and provide moisture and oil-free compressed air. Compressor shall be used with heat lance to blow out cracks.
3. The kettle used for heating the sealant must be an oil jacketed double boiler type melting unit which is equipped with both agitation and recirculation systems. It must have separate temperature thermometers for both the oil bath and melting vat to ensure proper temperature for the

sealant. It must be equipped with a pump to pressure-fill cracks with a wand applicator.

E. Preparation and Application.

1. All cracks and joints must be routed to a minimum of 2:1 ratio width versus depth. Cracks shall be blown out with 120 PSI compressed air. The road surface shall also be blown off at this time to clear it of any routed debris. Using the second compressor, the cracks shall be blown out using a heat lance. All cracks shall be pressure-filled by a wand applicator from the bottom up. They shall be slightly over-filled and squeegeed with "V" shaped squeegee to create an overband one inch (1") wide on each side of the routed reservoir. The cracks will then have a single ply toilet paper or other material as directed or approved by the Engineer applied to prevent any material from tracking.

F. Protecting Structures.

1. Surfaces of all structures, i.e. manhole covers, valve boxes, etc., shall be protected from being spattered or marred by crack sealant.

1409.1 CRACK SEALING OF ASPHALTIC SURFACE COURSE (Optional per Village)

A. The Contractor shall seal all cracks 1/4 inch or greater in width in the asphaltic surface course on streets shown on the Plans or listed in the Special Conditions.

1. Pavements shall be crack sealed in the spring, but no later than May 1st.

B. Material.

1. Crack sealant material shall be liquid asphalt conforming to the requirements of Section 455.2.4.2 of the "State Specifications".

C. Preparation and Application.

1. The crack sealant shall be placed in all surface cracks 1/4 inch or greater in width. Prior to filling cracks with sealant, the cracks shall be cleaned of all loose dirt and debris and blown clean with an air hose. After cleaning and blowing out the crack, sealant (heated to a liquid state) shall be placed to completely fill the crack to match the road surface. A sand riding surface shall then be sprinkled over the crack sealant material with sufficient depth to allow vehicles to drive across the crack without removing or otherwise disturbing the crack sealant.

D. Protecting Structures.

1. Surfaces of all structures, i.e. manhole covers, valve boxes, etc., shall be protected from being spattered or marred by crack sealant.

1450. ASPHALTIC CONCRETE PAVEMENT

- A. Asphaltic concrete pavement shall comply with Sections 450, 455, and 460 of the "State Specifications" as modified below. The pavement mix shall be Type E-0.3 for roadways unless specified otherwise and may be either Type E-0.3 or Type Asphaltic Surface for driveways and parking areas. The pavement mix shall be comprised entirely of virgin aggregate and asphaltic materials for upper layers and may be a recycled mix for lower layers.

1. Aggregate.

- a. Aggregate in the pavement mix shall conform to Subsection 460.2.2 of the State Specifications, including the gradation requirements of Subsection 460.2.2.3, and the gradations listed below.

	<u>Nominal Size</u>	<u>Minimum Layer Thickness</u>
Lower Layer	3/4" (19.0 mm)	2.25"
Upper Layer	1/2" (12.5 mm)	1.75"
Asphaltic Surface	3/8" (9.5 mm)	1.50"

2. Asphalt Cement.

- a. Asphalt cement shall conform to Subsection 455.2.4 of the "State Specifications" and shall be performance grade PG 58-28. Asphalt cement content shall be in accordance with approved mixes. The cost of asphaltic material shall be included in the unit price(s) bid for asphaltic concrete pavement.

3. Pavement Mix.

- a. Prior to beginning construction, the Contractor shall provide the Engineer with copies of current state approvals for the pit, mixing plant and design mixes for materials proposed to be used on this project.
- b. Asphaltic mixture shall be produced and incorporated in the work on the basis of a job-mix formula. The Contractor shall be responsible for the asphaltic job-mix design report, conforming to Subsection 460.2.7, and shall submit a signed copy of the report to

the Engineer for review at least two weeks prior to plant start up for paving production.

- c. Pavement mixtures shall be in accordance with Subsections 460.1 and 460.2 of the "State Specifications".

B. Pavement Compaction.

1. All pavements shall be built in accordance with the Maximum Density Method per Subsection 460.3.3 of the "State Specifications". The maximum specific gravity value shall be indicated on the asphaltic job-mix design report.
2. Pavements shall be compacted to a density not less than that shown in the table below:

Minimum Required Density:

LOCATION	LAYER	PERCENT OF TARGET MAXIMUM DENSITY		
		MIXTURE TYPE		
		E-0.3, E-1, and E-3	E-10, E-30, and E-30x	SMA
TRAFFIC LANES <sup>(1)</sup>	LOWER	91.5 <sup>(2)</sup>	92.0 <sup>(2)</sup>	94.0
	UPPER	91.5	92.0	94.0
SHOULDERS AND APPURTENANCES	LOWER	89.5	89.5	91.0 <sup>(3)</sup>
	UPPER	90.5	90.5	91.0 <sup>(3)</sup>

<sup>(1)</sup> Includes parking lanes as determined by the Engineer.

<sup>(2)</sup> Minimum reduced by 2 percent for < 3 million ESALs and one percent for > 3 million ESALs, when the first lift of lower layer constructed on base aggregate dense or recycled base courses.

<sup>(3)</sup> Minimum density will be 94.0 when the shoulders are paved integrally with the mainline pavement.

3. Delete Subsection 460.5.2.3 from the "State Specifications". Pavement density incentives do not apply to this project.

C. Recycled Asphaltic Concrete Pavement (Lower Layers).

1. The Contractor may use recycled asphaltic concrete pavement for lower layers.
  - a. The recycled pavement shall consist of a mix of salvaged asphaltic pavement materials, presently stockpiled for use by the Contractor, and the required amounts of aggregate and asphalt cement. The recycled pavement shall be in accordance with a State approved mix calculated for the stockpiled material and comply with Section

460 of the "State Specifications". The Contractor shall submit a copy of the job-mix formula to the Engineer.

- b. The unit price bid for asphaltic concrete pavement shall be for all costs for the use of either virgin mix or recycled mix at Contractor's option. No adjustment in unit price will be allowed for changes in use of virgin or recycled mixes.

D. Butt Joints.

- 1. The Contractor shall construct butt joints wherever the new pavement overlay butts up to existing pavements; including at intersecting streets, project ends and as shown on the Plans or in the Appendix.
- 2. Butt joints may be constructed by removing a section of pavement or by milling or grinding down 1-1/2 inches of pavement. Saw-cuts shall be in neat straight lines at right angles to the street in accordance with Section 1204.1 of these Special Provisions.

E. Pavement Passes and Thickness.

- 1. Lower layer and upper layer passes shall be staggered to prevent joints from extending through the entire asphaltic pavement.
  - a. Four inch thick asphaltic pavement shall consist of a 2-1/4 inch lower layer and a 1-3/4 inch upper layer.
- 2. The longitudinal joint(s) in the upper layer shall be located at the centerline of the pavement and/or at edges of traffic lanes.

F. Tack Coat.

- 1. A tack coat shall be applied to each lower layer prior to placing the succeeding layer. Apply the tack coat the same day that the next layer is placed.
  - a. Tack coat material shall be an asphalt emulsion, conforming to Subsection 455.2.5 of the "State Specifications", diluted with an equal amount of water and applied at a rate of 0.025 gallons per square yard or at a rate required to effectively bond the overlying material.
- 2. The cost of applying tack coat shall be included in the unit price(s) bid for asphaltic concrete pavement.

G. Temperature of Asphalt Placed.

1. All asphalt (both upper and lower layers) shall be placed at a temperature of 250°F or higher.

H. Cold Weather Work.

1. Asphaltic pavement shall not be placed when the air temperature in the shade is less than 35°F unless approved by the Engineer.
2. Paving done during the period between October 15th and May 1st shall be placed in accordance with Subsection 450.3.2 of the "State Specifications".

I. Construction Equipment.

1. The paver shall have sufficient power and traction to operate on grades. Screed extensions with static extensions shall not exceed 12 inches. Automatic control systems shall be used unless otherwise determined by the Engineer.
2. Vibratory rollers shall conform to Subsection 450.3.1.5.

J. Construction Methods.

1. Prior to placing asphaltic base or surface courses, all required corrections of filling potholes, sags, and depressions shall be made.
2. All edges of existing abutting asphaltic pavements shall be saw-cut immediately prior to paving to form a straight firm joint, unless otherwise waived by the Owner.
3. All rolling shall be performed during daylight hours or as approved by the Engineer.

K. Proofrolling.

1. Prior to placing the asphaltic pavement lower layer, the Contractor shall test the base strength by proofrolling. Proofrolling shall involve running loaded trucks or scrapers over the entire roadway (pavement plus shoulders) width. Weak or soft spots in the base or subbase course shall be removed, replaced with clean base or subbase course material, compacted in 6 inch maximum lifts and retested.

L. Paving Schedule.

1. Refer to Subsection 101.E.3. of these Special Provisions for the paving schedule.
2. Note that surface course will not be placed until the third or subsequent year on new subdivision roads.

1450.1. ASPHALTIC DRIVEWAYS

- A. Asphaltic driveways shall be constructed in accordance with Sections 1304 (Base) and 1450 (Pavement) of these Special Provisions. The pavement mix shall be Type E-0.3 or Asphaltic Surface conforming to Subsection 465. Residential drives shall consist entirely of upper layer design mixtures and commercial and industrial drives shall consist of both lower layer and upper layer design mixtures.
1. The cost of placing asphaltic concrete pavement on driveways will be paid for at the unit price bid for asphaltic concrete pavement (upper layer) and the cost of placing base aggregate dense 1-1/4-inch on driveways will be paid for at the unit price bid for base aggregate dense.
  2. Existing asphaltic drives shall be replaced "in-kind" except that the following minimum thicknesses shall be placed:
    - a. Residential - 6" base and 3" pavement (1-1/2" upper layer and 1-1/2" lower layer using 9.5 mm [3/8 inch] aggregate gradation).
    - b. Commercial - 8" base and 4" pavement (1-3/4" upper layer and 2-1/4" lower layer using 12.5 mm [1/2 inch] aggregate gradation).
    - c. Industrial - 12" base and 4" pavement (1-3/4" upper layer and 2-1/4" lower layer using 12.5 mm [1/2 inch] aggregate gradation).

1521. CORRUGATED STEEL CULVERT PIPE

- A. The installation of culverts shall comply with Section 521 of the "State Specifications".
1. Culverts shall be placed in trenches excavated through existing ground or through compacted embankments.
  2. The trench shall be wide enough to permit thorough compaction of backfill material. The bottom of the trench shall be shaped by means of a template so that at least 10% of the outside diameter of the pipe will be in contact with the bottom of the trench. Backfill the trench with selected excavated material placed in six (6) inch maximum lifts and mechanically

compacted to a minimum of 90% Standard Proctor Density. Backfill material shall be brought up simultaneously on both sides of the pipe.

B. Materials.

1. Corrugated steel pipe shall be furnished for the following minimum gages/thicknesses.

6" CSCP	18 gage (0.052 in.)
8" thru 24" CSCP	16 gage (0.064 in.)
30" & 36" CSCP	14 gage (0.079 in.)

C. Steel Apron Endwalls.

1. Steel apron endwalls, complying with Sections 520 and 521 of the "State Specifications" and the Standard Detail Drawings included in the Appendix, shall be installed at the ends of all culverts.

1600. CONCRETE MASONRY

A. Grade of Concrete

1. All concrete shall be Grade A, air-entrained, as specified in Subsection 501.3.2 of the "State Specifications".
  - a. All concrete shall be "ready-mixed".

B. Surface Finish.

1. All concrete shall receive a brush finish.

C. Curing.

1. Concrete pavement, curb and gutter and sidewalk shall be cured in accordance with the requirements of Subsection 415.5.10 of the "State Specifications", except that all concrete shall be cured by the Impervious Coating Method as specified in Subsection 415.5.10.2.

D. Test Specimens.

1. The Contractor shall take two representative concrete samples in accordance with ASTM C-31 for 7 day and 28 day compression testing in accordance with ASTM C-39 from approximately every 25 cubic yards of concrete placed or as directed by the Engineer. This work shall conform to Subsection 501.3.10 of the "State Specifications".

2. Test cylinders shall be six inches in diameter by 12 inches in height.
3. The Contractor shall field cure, care for and ship the test cylinders to the testing laboratory. All costs of preparing the cylinders, shipping and testing shall be included in the unit prices bid for pertinent concrete items.
  - a. Copies of test results shall be delivered to the Engineer.

#### 1601. CONCRETE CURB AND GUTTER

##### A. Standard Section.

Concrete curb and gutter shall conform to the East Troy standard 30 inch roll type curb and shall be constructed in accordance with Section 601 of the "State Specifications" and the typical section shown in the Appendix.

1. Concrete masonry shall conform to Section 1600 of these Special Provisions.

##### B. Dense Graded Base.

1. Construct curb and gutter on a layer of compacted base aggregate dense base course, placed to a thickness matching the subgrade elevation of the curb and gutter to the subgrade elevation of the adjacent pavement.
2. Material.
  - a. The base material shall conform to Section 305 of the "State Specifications" and shall be base aggregate dense 1-1/4 inch and/or 3 inch.

##### C. Contraction Joints.

1. Spacing.
  - a. Adjacent to Asphalt Pavement.
    - (1) Contraction joints in curb and gutter adjoining asphaltic pavement shall be spaced at intervals of 10 feet or as directed by the Engineer.
  - b. Adjacent to Concrete Pavement.
    - (1) Contraction joints in curb and gutter adjoining concrete pavement shall be spaced to match joints in the abutting concrete pavement.

- (2) Contraction joints shall be placed at a typical 15 foot spacing.
2. If the Contractor elects to saw-cut the joints, the joints shall be saw-cut the same day when normal or rapid concrete setting conditions prevail. If conditions exist that retard the setting of the concrete, the saw-cutting of the joints shall be delayed until the concrete has set sufficiently to preclude raveling during the sawing. If shrinkage cracks develop prior to saw-cutting, the cracked sections of concrete shall be removed to such an extent that the normal joint spacing will still exist. Contraction joints constructed by saw-cutting shall be a minimum of 2 inches in depth.

D. Expansion Joints.

1. Expansion joints shall be placed as outlined in Subsection 601.3.6 of the "State Specifications". Joint filler shall be 3/4" expansion fiber material.
2. Place expansion joints at the locations shown on the Plans and/or in the Appendix and as detailed below:
  - a. Curb and Gutter Located Adjacent to Asphalt Pavement.
    - (1) At the PC and PT of horizontal curves.
    - (2) Three feet from each side of drainage structures.
    - (3) At 300 foot maximum spacing on both tangents and curves.
  - b. Curb and Gutter Located Adjacent to Concrete Pavement.
    - (1) Place expansion joints to match expansion joints in the abutting concrete pavement.

E. Opening to Traffic.

1. Traffic shall not be allowed on curb and gutter for a period of at least 7 days after placing or until the concrete has attained a compressive strength of at least 3,000 pounds per square inch in accordance with Subsection 415.3.17 of the "State Specifications".

F. Tapered Curb Ends

1. A tapered curb section shall be constructed at the ends of the curb and gutter where shown on the Plans. The tapered sections shall be 3 feet long

and end with a 2 inch high curb. A contraction joint shall be placed at the end of the tapered section.

- G. Curb sections shall be depressed at street intersections to provide for future sidewalk ramps.

## 1602. CONCRETE SIDEWALK, STEPS, AND DRIVEWAYS

### A. Standard Sections.

1. The construction of concrete sidewalks, steps, and driveways shall comply with Section 602 of the "State Specifications" and the standard detail(s) shown in the Appendix.
2. Concrete masonry shall conform to Section 1600 of these Special Provisions.
3. Sidewalks.
  - a. Standard sidewalks shall be 4 inches minimum thickness except at driveways where the sidewalk shall match the thickness of the adjacent concrete drive with a minimum thickness of 6 inches provided.
4. Driveways.
  - a. Concrete driveways shall be reinforced with polypropylene fiber mesh, 1.5 pounds per cubic yard, and shall be constructed to the following minimum thicknesses.
    - (1) Residential - 6 inches thick.
    - (2) Commercial - 7 inches thick.
    - (3) Industrial (heavy duty) - 9 inches thick.
  - b. Curb Cutouts.
    - (1) Cutouts for driveways in existing high back curb (non-mountable) shall be done using a cutout machine.
      - (a) Contractors doing this work include Hardrock, Elkhorn, Wisconsin, ([262] 723-3333) and Interstate, Palatine, Illinois, ([847] 776-8030).

- (2) Drive openings may also be made by removing a section of curb and gutter (to existing joints or saw-cut curb and gutter) and replacing with a drive opening section. New gutter sections shall be dowelled in accordance with Section 1602.C.4 of these Special Provisions except place 3 rebar on each side.

B. Base Course.

1. Concrete sidewalk, steps, and driveways shall be constructed on a compacted gravel base. The gravel base shall be dense graded base conforming to base aggregate dense 3/4-inch (sidewalk and steps) and base aggregate dense 1-1/4-inch (driveways) of Subsection 305.2.2 of the "State Specifications". The cost of base course shall be included in the prices bid for concrete sidewalk, steps and driveways. The base shall be constructed to the following minimum thicknesses.
  - a. Concrete sidewalk and steps (excluding 6 inch sidewalk at drives) - 2 inches thick.
  - b. Concrete driveways (including 6 inch sidewalk at drives) - 6 inches thick.

C. Joints.

1. Joints shall be placed and constructed in accordance with Subsection 602.3.1.5 of the "State Specifications" and these Special Provisions.
2. Expansion Joints: Place one-half (1/2) inch expansion joints as directed below:
  - a. Through sidewalks at uniform intervals of not more than 96 feet.
  - b. At joints with intersecting sidewalks.
  - c. Between sidewalk and/or driveway and back of curb and gutter. Construct the sidewalk or driveway grade 1/4 inch higher than the back of curb elevation where they meet.
  - d. At the intersection of 4 inch sidewalk with (6 inch) drives.
  - e. Place one inch expansion joints between sidewalk and buildings or other rigid structures.

3. Contraction Joints.

a. Sidewalk.

- (1) Place contraction joints at a 5 foot typical spacing or as directed by the Engineer. Contraction joint spacings shall typically match adjacent sidewalk sections.

b. Driveways.

- (1) Where the terrace is greater than 6 feet wide, place one joint parallel to the street (6 foot maximum spacing).
- (2) Place one joint on the centerline at a right angle to the street. If the drive is greater than 16 feet wide, place joints at a maximum 8 foot spacing.

4. Dowelled Joints.

- a. Where sidewalk construction is not continuous, such that adjacent sections of sidewalk are constructed at different times, then the abutting sidewalk sections shall be joined together with tie bars.
- b. Place two #4 rebar 2.0 feet long by 2 feet apart centered in the walk in the last section(s) of the first sidewalk constructed.

D. Handicap Ramps.

1. Handicap ramps shall be constructed at locations shown on the Plans in accordance with the Standard Detail Drawings included in the Appendix.
2. Curb ramp detectable warning fields are to be yellow in accordance with the Standard Detail Drawings shown in the Appendix.

E. Opening to Traffic.

1. Pedestrian traffic shall not be allowed for a period of at least 3 days after placing concrete and vehicular traffic shall be excluded for a period of at least 7 days after placing or until the concrete has attained a compressive strength of at least 2,500 pounds per square inch.

## 1611.1. MANHOLE AND VALVE BOX ADJUSTMENTS

### A. Manhole Adjustments.

1. The Contractor shall adjust manhole castings to grade by adding or removing concrete adjusting rings, concrete brick and/or concrete block. After removing the manhole casting and rings, the Contractor shall clean the casting and manhole mating surfaces to remove all loose mortar and other substances.
  - a. The Contractor shall take precautions to prevent gravel and other materials from entering the manhole. All materials falling into the manhole shall be removed by the Contractor.
  - b. Manhole adjustments are shown on the Plans.
2. Concrete adjusting rings shall be furnished by the Contractor and shall match the dimensions of existing rings and/or manhole castings. Concrete rings shall be reinforced with one line of steel centered within the ring.
3. Set adjusting rings and manhole frames on a bed of butyl sealant and non-shrink grout in accordance with Subsections 210.B.1 (sanitary sewer) and 410.B.1 (storm sewers) of these Special Provisions.
4. Seal outside manhole surfaces with butyl sealant in accordance with Subsections 210.B.2 (sanitary sewers) and 410.B.2 (storm sewers) of these Special Provisions.
5. The Village shall inspect all work when setting manhole rings and frames.

### B. Manhole Adjustment/Reconstruction.

1. Manholes that cannot be brought to final grade by adding or removing adjusting rings shall be adjusted to grade in accordance with the following procedure:
  - a. Remove casting, rings, brick or block, cone section, and riser section(s) as required.
  - b. Place new riser section(s) and/or cone section, 3" to 18" of concrete adjusting rings and reset casting to grade in accordance with Subsections 1611.1.A and 210.C (riser section joints). Salvaged materials in satisfactory condition may be reused if approved by the Engineer. A flat-top slab may be substituted for the cone section. Install steps if required.

2. Concrete Block Manholes: Manholes that cannot be brought to final grade by the methods described in Section 1611.1.A.1 above shall be adjusted to grade in accordance with the following procedure:
  - a. Remove casting, rings, bricks, and the concrete block cone section down to the top of the barrel section and remove all mortar. The Contractor shall take precautions to prevent gravel, mortar, and other material from entering the manhole. All material falling into the manhole shall be removed by the Contractor.
  - b. Using solid concrete barrel block and mortar conforming to the requirements of Chapter 3.5.0 of the "Standard Specifications", extend the manhole barrel up to an elevation between 17 inches and 32 inches below finished grade. Install new manhole steps in alignment with existing steps and at existing intervals. Place concrete cover with opening, adjusting rings, and manhole casting in accordance with paragraph 3 below.
3. Manholes shall be constructed in accordance with Chapter 3.5.0 and File Nos. 11, 12, and 15 of the "Standard Specifications" and these Special Provisions.
  - a. Manhole steps shall be OSHA approved and fabricated using 3/8" minimum diameter steel reinforcing rod with molded plastic covering.
  - b. Joints for precast manhole riser sections shall be made with rubber "O"-ring gaskets, a continuous ring of butyl rubber sealant (EZ-Stik or Kent-Seal in rope form) or equal except that joints for storm sewer manholes may also be made with mortar. The butyl sealant shall be 1 inch diameter equivalent or as recommended by the manhole manufacturer.
  - c. Revise Chapter 6.38.0 of the "Standard Specifications" to require that concrete brick and block shall be colored "red or pink", conforming to Subsection 519.2.2 of the "State Specifications".
  - d. Set adjusting rings and manhole frames on a bed of butyl sealant and non-shrink grout in accordance with Subsections 210.B.1 (sanitary sewer) and 410.B.1 (storm sewers) of these Special Provisions.
  - e. Seal outside manhole surfaces with butyl sealant in accordance with Subsections 210.B.2 (sanitary sewers) and 410.B.2 (storm sewers) of these Special Provisions.

- f. The Village shall inspect all work when setting manhole sections, rings, and frames, prior to placing backfill.
- C. Valve Box Adjustments.
  - 1. The Contractor shall adjust valve boxes to grade by screwing or sliding the valve box top section to the required elevation or by adding or removing valve box sections.
- D. Finished Grade.
  - 1. Concrete Pavement.
    - a. The top of valve boxes and manhole castings shall be set to match the finished concrete grade.
  - 2. Asphaltic Pavement.
    - a. The top of valve boxes and manhole castings shall be set 1/4 inch below the finished asphaltic grade.
- E. Protection of Projecting Structures.
  - 1. The Contractor shall protect manholes and valve boxes projecting above the subbase or base material (prior to placement of base course and pavement) with barriers and flashing lights or (after the base course has been constructed) by temporarily placing base course material around the projecting structure.
- F. Misaligned Structures.
  - 1. The Contractor shall take precautions to protect all manhole frames and valve boxes from being damaged or moved out of alignment. The Contractor shall adjust all misaligned manhole frames and valve boxes, disturbed by his operations, at no cost to the Owner.
- G. Valve and Valve Box Inspection.
  - 1. Grading/Base Course Construction.
    - a. The road contractor, accompanied by the Village DPW or his representative, shall inspect all valves and valve boxes, including hydrant valves, upon completion of grading work and base course construction. This inspection shall include removing all dirt and gravel from valve boxes and operating valves to ensure that the

valve box is straight, the valve nut is accessible, and that the valve is operational.

2. Paving.

- a. The paving contractor, accompanied by the Village DPW or his representative, shall inspect all valves and valve boxes, including hydrant valves, prior to commencing paving operations. This inspection shall include removing all dirt and gravel from valve boxes and operating valves to ensure that the valve box is straight and centered over the valve, the valve nut is accessible, and that the valve is operational.

1611.2. CATCH BASIN ADJUSTMENTS

- A. Existing catch basins shall be adjusted, as required, to the required elevation by removing the castings and adjusting the top of the structure by removing or adding concrete, brick masonry or concrete brick or block masonry and resetting the casting as specified in Subsections 415.A.3 (setting) and 415.A.4 (waterproofing) of these Special Provisions.

1612. UNDERDRAINS

- A. Underdrains installed as part of this project shall conform to the appropriate paragraphs of Section 612 of the "State Specifications".
  1. The six (6) inch underdrain pipe shall be perforated corrugated polyethylene pipe conforming to Section 612.2.5 of the "State Specifications".
  2. The underdrain pipe shall be wrapped with a geotextile fabric sock, ADS Drainguard, or equal.
  3. The underdrain pipe shall be placed to drain, in a trench a minimum of 12" deep and shall have a minimum of 6" of cover material as shown in the detail in the Plans or Appendix.
    - a. Granular backfill for underdrains shall be in accordance with the pertinent requirements of Section 209 of the "State Specifications", except as modified below.
      - (1) Granular backfill material shall comply with the following gradations:

<u>Sieve Size</u>	<u>% by Weight Passing</u>
1/2 Inch	100%
3/8 Inch	90 - 100
No. 8	0 - 15
No. 30	0 - 3

4. The excavation for underdrains may be completely filled in a single operation. No further consolidation or compactive effort will be required. A minimum of twelve (12) hours shall elapse before paving over the backfill.

#### 1617. DELIVERY TICKETS

- A. Delivery tickets shall be furnished by the Contractor for materials bid on a unit price per weight or volume: i.e., crushed aggregate base course, asphaltic concrete pavement, borrow excavation and topsoil. Scales are to be furnished by the Contractor and shall have been tested within the preceding 6 months to ensure accuracy by an authorized testing firm. A copy of the test report shall be provided to the Engineer.

#### 1625. TOPSOIL AND SALVAGED TOPSOIL

- A. Topsoil and salvaged topsoil shall comply with Section 625 of the "State Specifications".
  1. Topsoil and salvaged topsoil shall consist of materials as specified in Subsection 625.2.
- B. Topsoil Stripping and Topsoil Stockpile.
  1. Road Construction.
    - a. Strip all topsoil from beneath the traveled roadway to two (2) feet minimum beyond the back of curb and from all cut areas.
  2. Subdivisions and Site Development.
    - a. Strip all topsoil from within the grading limits of the entire site, except as shown otherwise on the Plans or as specified below, as directed by the Engineer.
      - (1) Strip all topsoil from within street right-of-ways prior to beginning utility construction.

3. Stockpile an adequate amount of satisfactory topsoil for spreading over excavated lawn and terrace areas.

C. Placing Salvaged Topsoil.

1. Roads.

- a. Place four (4) inches minimum to eight (8) inches maximum of satisfactory salvaged topsoil or topsoil over all excavated terrace areas and blend with existing lawns.

- (1) Topsoil shall be placed in accordance with Paragraph 625.3.3.

2. Subdivisions and Site Development.

- a. Satisfactory salvaged topsoil or topsoil shall be placed and spread over the entire site grading area, including roadway terraces, to a uniform depth (4 inches minimum) as required to dispose of all salvaged topsoil.

- (1) Topsoil shall be placed in accordance with Paragraph 625.3.3.

3. Excess salvaged topsoil shall be disposed of in accordance with Section 1205.4 of these Special Provisions.

- a. Excess salvaged topsoil may be used as fill if approved by the Engineer. Place outside of roads, building pads, and other areas requiring structural fill.

4. Place unsatisfactory salvaged topsoil (containing stones or clay soils) over fill areas outside of roads and building pads and cover with 4 inches minimum of suitable salvaged topsoil.

1630. LAWN RESTORATION (NEW DEVELOPMENTS)

- A. Lawn restoration shall include placing salvaged topsoil and furnishing and placing fertilizer, seed and mulch.

- B. Fertilizer.

1. Fertilizer shall comply with Section 629 of the "State Specifications". Apply Type A fertilizer at 7 pounds per 1,000 square feet.

C. Seeding.

1. Seeding shall comply with Section 630 of the "State Specifications".
2. Lawn Type Turf.
  - a. Grass seed shall meet the requirements of Subsection 630.2.1.5.1.1.1 (Seed Mixture No. 40), except that seed shall be distributed at a rate of four (4) pounds per 1,000 square feet.
3. Rural Type Turf.
  - a. Grass seed placed in rural areas where lawn type turf is not required shall meet the requirements of Subsection 630.2.1.5.1.1.1 (Seed Mixture No. 20) of the "State Specifications", except that seed shall be distributed at a rate of five (5) pounds per 1,000 square feet.
4. The Contractor shall furnish all empty seed bags to the Owner.

D. Mulching.

1. Mulching shall comply with Section 627 of the "State Specifications". All seeded areas shall be mulched.
  - a. The Contractor may use either Method A, B or C of Subsection 627.3 when placing mulch.

E. Lawn Restoration Timetable.

1. Seeding may be done at any time during the growing season when soil conditions are suitable.
2. Weather permitting, lawn restoration shall be completed within 10 calendar days after topsoil has been placed.
3. All lawn restoration work shall be completed by September 15th of the same year or by May 15th of the following spring.

1631. SODDING

- A. The item of sodding shall comply with Section 631 of the "State Specifications", as amended below.

B. Materials.

1. Sod shall consist of permanent grasses, indigenous to the general locality where it is to be used and practically free from weeds or undesirable grasses.
2. The Contractor shall submit a certificate to the Engineer before installation detailing the sod grass composition and place of origin.
3. Sod shall be cut in uniform strips approximately 18" x 72", be 3/4" thick or more and have grass 2" tall.

C. Areas to be sodded shall be covered with 4 inches minimum of topsoil or salvaged topsoil and fertilized in accordance with Section 1630 of these Special Provisions. The cost of placing topsoil and fertilizer shall be included in the unit price bid for sodding.

D. Sodded areas shall be constructed in accordance with Subsection 631.3 of the "State Specifications".

E. All sodded areas shall be kept thoroughly moist by watering or sprinkling, when rainfall is deficient, for a minimum period of ten days or until final project completion.

1632. FURNISHING AND PLANTING PLANT MATERIALS

A. General.

1. Furnishing and planting plant materials shall be in conformance with Section 632 of the "State Specifications".

B. Materials.

1. Plants.

- a. Unless otherwise provided for or approved by the Engineer, all plant materials shall conform to the requirements of Subsection 632.2 of the "State Specifications" and to the requirements specified herein. Plants shall include all trees, shrubs and vines as shown on the Plans and/or as specified herein.

C. Equipment.

1. The Contractor shall provide all equipment, labor and incidentals necessary to furnish, haul and place plant materials shown on the Plans.

2. The Contractor shall furnish watering equipment per Subsection 632.15 of the “State Specifications”. Water will be available from the Village at no cost to the Contractor.

D. Construction Methods.

1. Plants.

- a. Plant construction methods shall conform to Subsection 632.3 of the “State Specifications”.
- b. Place wood mulch over all plants per the requirements of Subsection 632.3.9 of the “State Specifications”.

E. Plant Establishment and Replacement.

1. The plant establishment period shall be a one year period. The establishment requirements shall conform to Subsection 632.3.18.1.3 of the “State Specifications”.
2. Plant care and maintenance shall be per Subsection 632.3.19 of the “State Specifications”.
3. Acceptance and replacement of plant material shall be per Subsection 632.3.20 of the “State Specifications”.

1633. MARKER POSTS WITH DELINEATORS

- A. Marker posts with delineators shall comply with Sections 614 and 633 of the “State Specifications” and Standard Detail Drawing 15A2-2 included in the Appendix. Marker posts shall be painted wood posts.

1637. END OF ROADWAY MARKER

- A. End of roadway markers shall be Type II Signs conforming to Section 637 of the “State Specifications” and the details in the Appendix. Place 4 markers at 6 feet center to center and 10 feet beyond the end of pavement.
- B. Markers shall consist of nine 3-inch diameter red reflectors mounted symmetrically on an 18-inch diamond shaped black panel. The marker shall be at least 4 feet above the ground.

1646. PAVEMENT MARKING

- A. Pavement marking shall be in accordance with Section 646 of the “State Specifications” and the details shown in the Appendix.

B. Material.

1. Pavement marking material shall be epoxy conforming to Subsection 646.2.4.
2. Glass beads shall be applied with the paint.

1647. PAVEMENT MARKING, PARKING STALL

A. Pavement marking for parking stalls shall be in accordance with Section 647 of the “State Specifications”, as amended herein.

B. Material.

1. Pavement marking material shall be white paint conforming to Subsection 646.2.2 of the “State Specifications”. Paint shall be applied in 4 inch wide stripes.
2. Glass beads are not required.

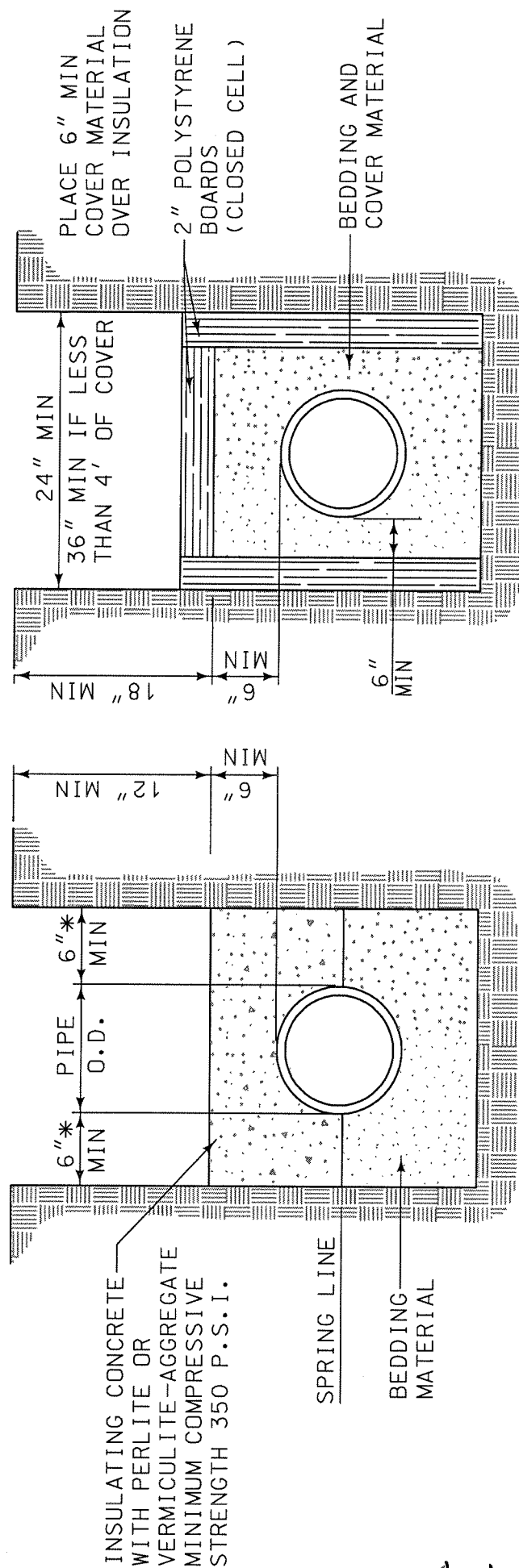
C. Removing Pavement Markings.

1. Parking stall stripes shall be removed in accordance with Subsection 646.4.9.

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\* 12" MIN WITH LESS THAN 4' COVER

## INSULATING CONCRETE

## POLYSTYRENE INSULATION

## NOTES

INSULATE WATER MAINS, SANITARY SEWERS AND LATERALS  
WITH LESS THAN 5' COVER AND WATER SERVICES HAVING  
LESS THAN 6' OF COVER

USE POLYSTYRENE BOARDS UNLESS INSULATING CONCRETE IS SHOWN ON THE PLANS OR APPROVED BY THE ENGINEER



**CRISPELL-SNYDER, INC.**  
CONSULTING ENGINEERS

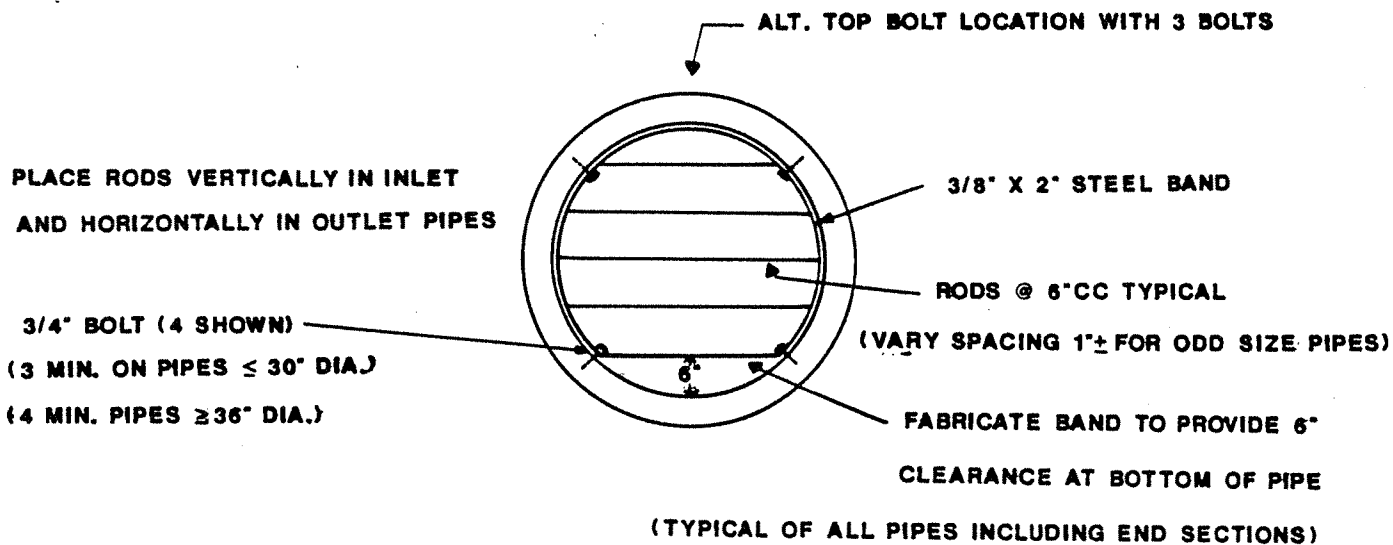
Elkhorn, WI (414)723-5600  
Racine, WI (414)554-8530 Sheboygan, WI (920)458-5512

## INSULATION DETAILS

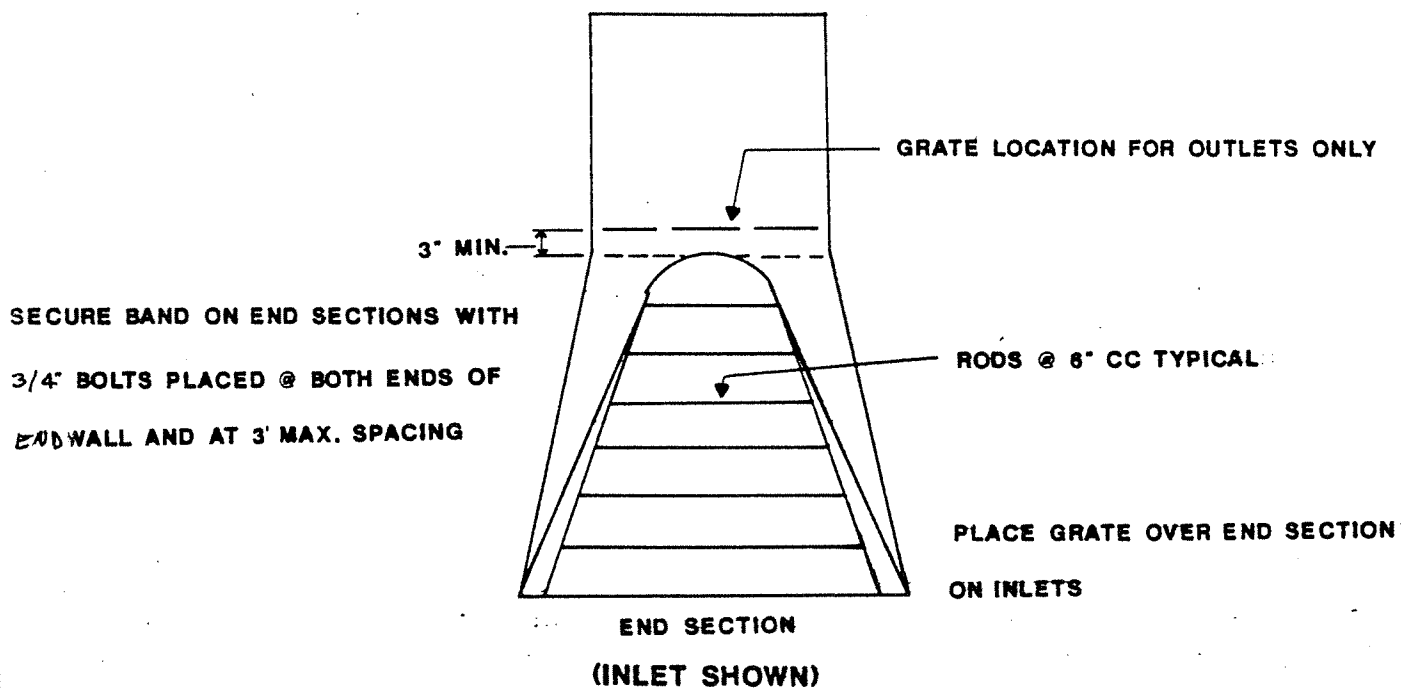
98036

LOCATION: VILLAGE OF EAST TROY

SCALE: NONE      DATE: SEPT, 1998      DRAWN BY: T. HENNEY



PIPE SECTION  
(OUTLET SHOWN)



CRISPELL-SNYDER, INC.

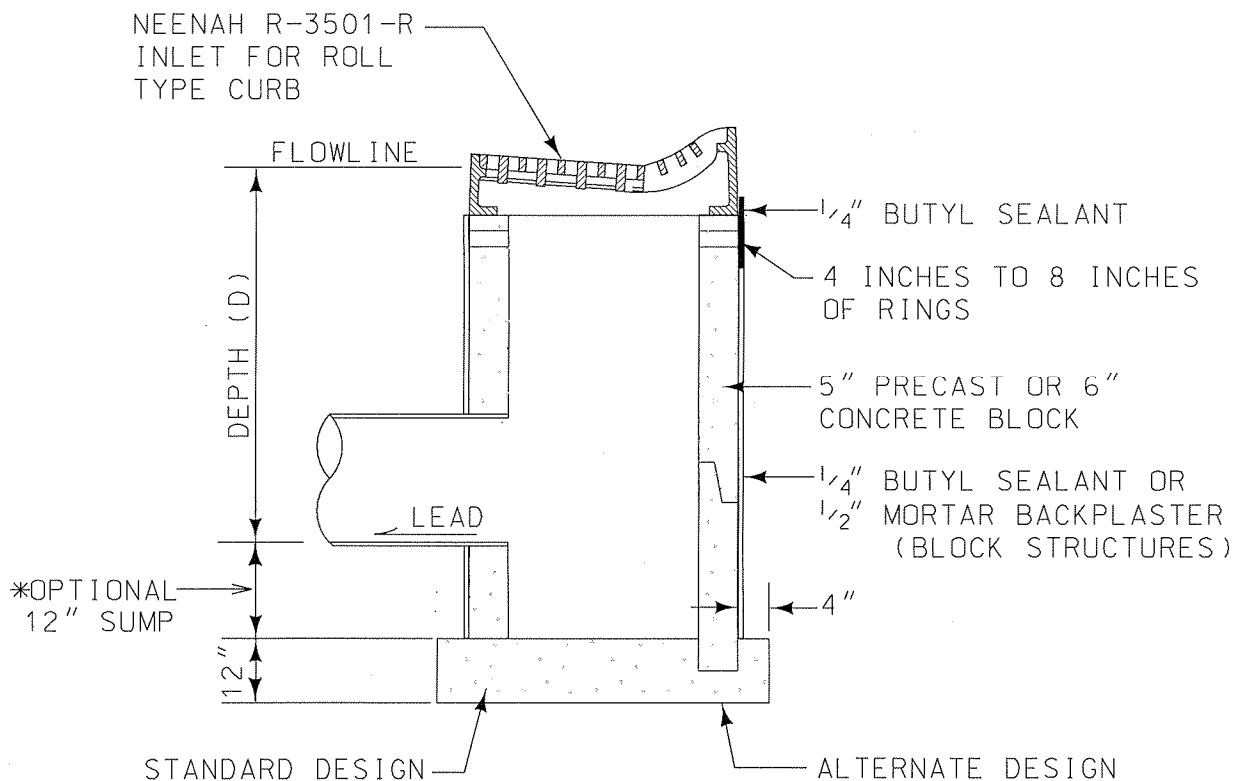
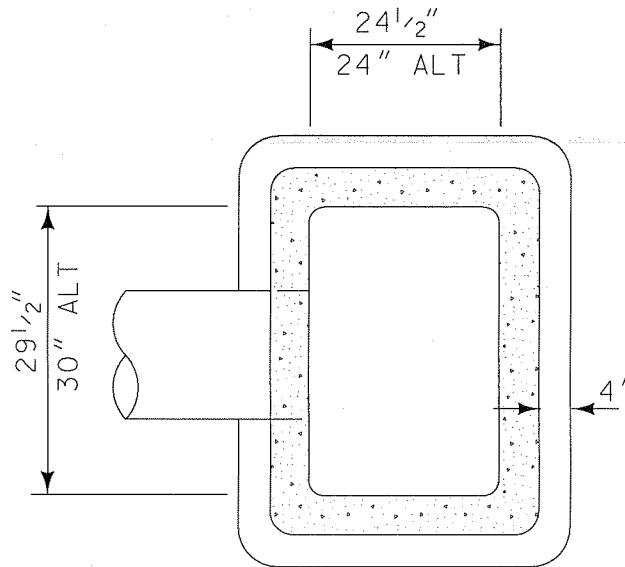
CONSULTING ENGINEERS  
114 W. COURT STREET, ELKHORN, WI 53121  
1 (414) 723-5500 FAX 1 (414) 723-5106

STORM SEWER PIPE GRATE DETAILS

REF: CHAPTER 6.16.0 "STANDARD SPECIFICATIONS"

SCALE: NO SCALE DATE: 11/89

DRAWN BY: JON WITTER



TUCK POINT ALL INTERNAL MORTAR JOINTS

\* CONSTRUCT SUMP ONLY IF THE STORM SEWER DISCHARGES DIRECTLY TO A LAKE OR STREAM. SET RINGS AND CASTING ON BUTYL SEALANT AND MORTAR. WRAP CATCH BASIN WITH POLYETHYLENE WRAP. SEE SPECIAL PROVISIONS.

# STANDARD CATCH BASIN FOR ROLL TYPE CURB

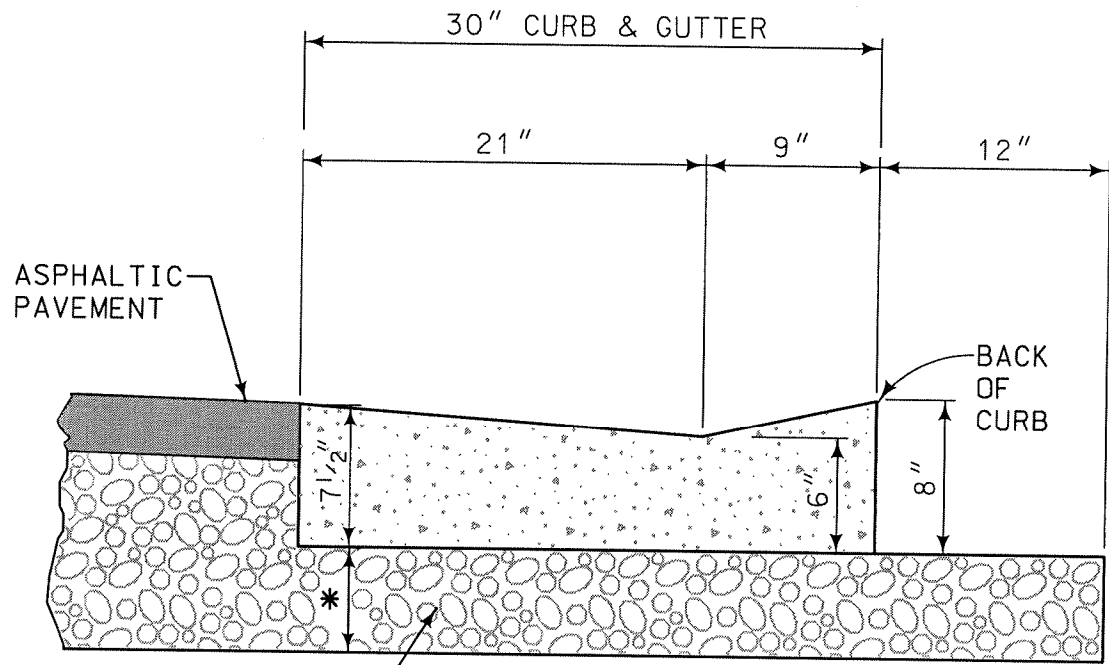
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A-3

LOCATION: VILLAGE OF EAST TROY  
WALWORTH COUNTY, WISCONSIN  
SCALE: NONE DATE: DECEMBER, 2007  
DRAWN BY: C. ELVIN

REVISION/PLOT DATE \_\_\_\_\_



30-INCH ROLL TYPE CURB

ET-CG1



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**CONSULTING ENGINEERS**

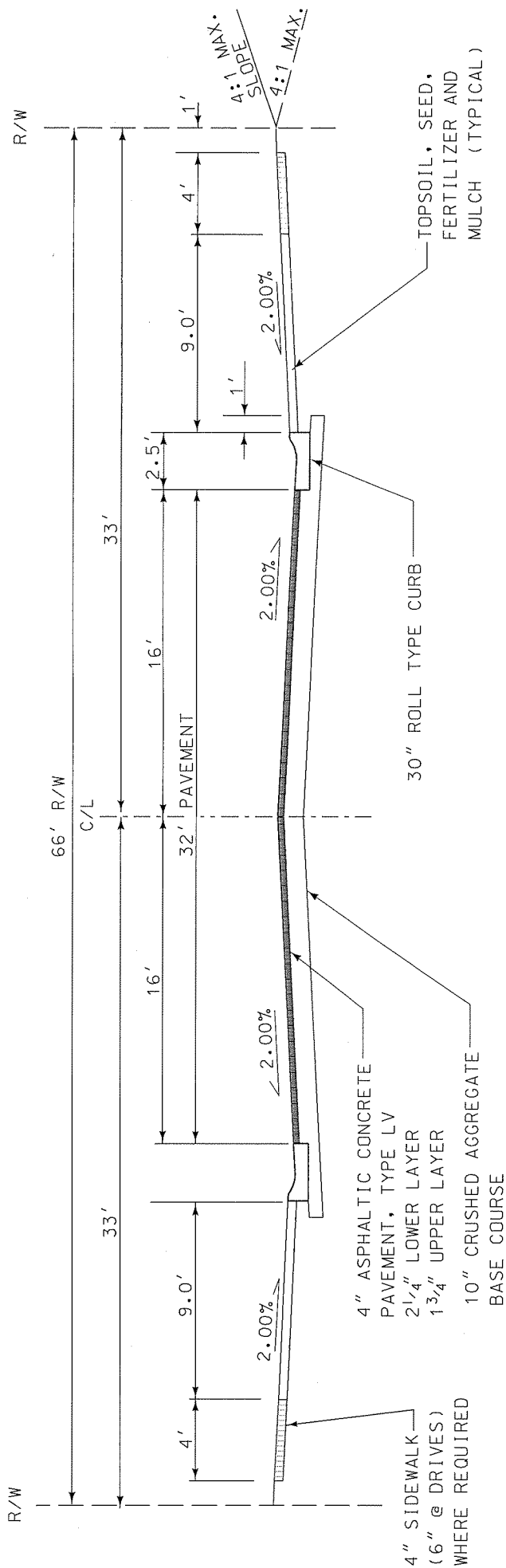
Elkhorn, WI (414)723-5600  
Racine, WI (414)554-8530 Sheboygan, WI (920)458-5512

A-4

LOCATION: VILLAGE OF EAST TROY  
WALWORTH COUNTY, WISCONSIN

SCALE: NONE DATE: DEC 10, 1997

DRAWN BY: G. THOMPSON



A-5

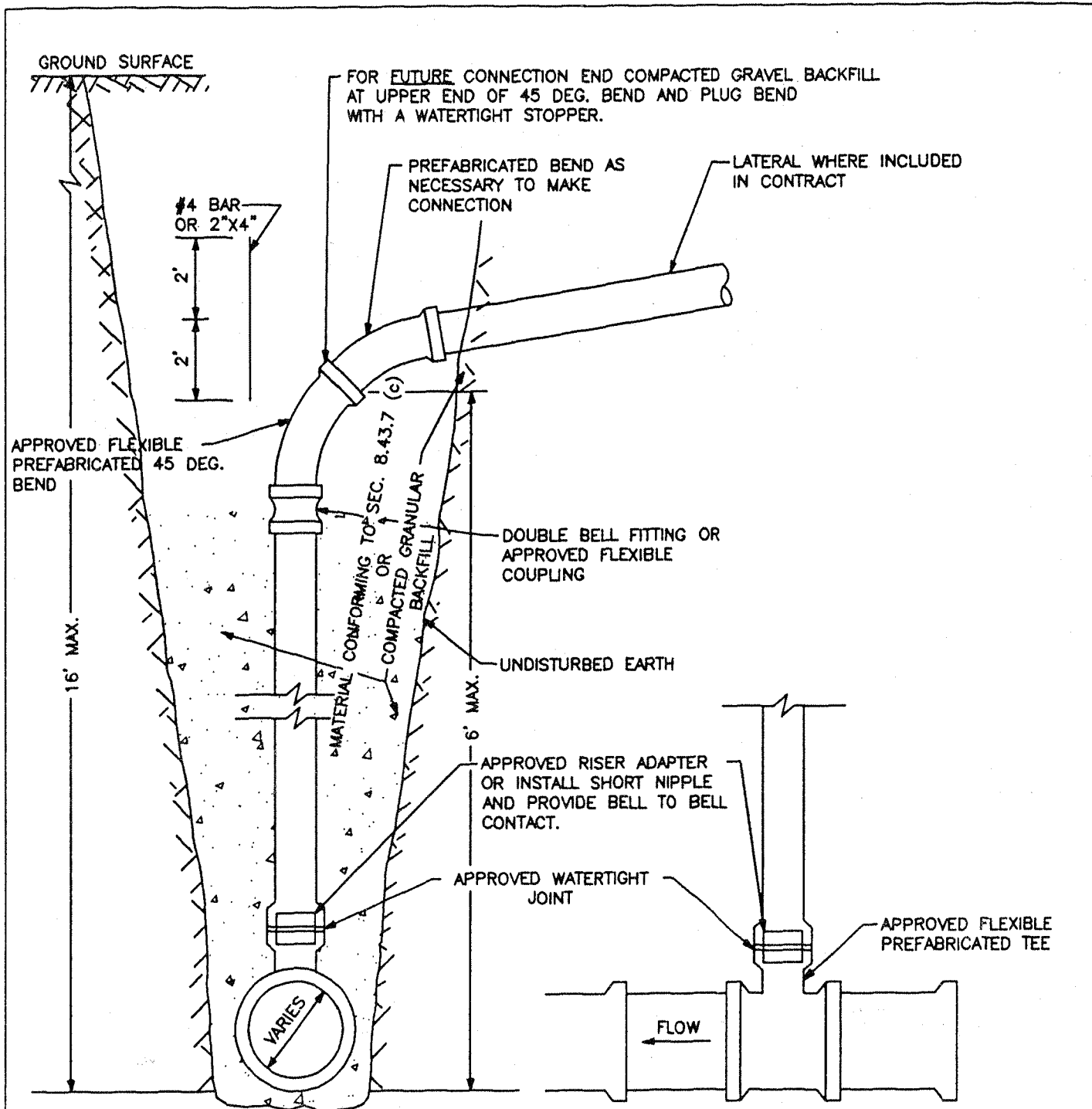
**CRISPELL-SNYDER, INC.**  
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Racine, WI (262)554-8530 Sheboygan, WI (920)458-5512

TYPICAL RESIDENTIAL STREET SECTION

A-5

LOCATION: VILLAGE OF EAST TROY, WALWORTH COUNTY, WISCONSIN

SCALE: NONE DATE: FEBRUARY, 2008 DRAWN BY: C. ELVIN

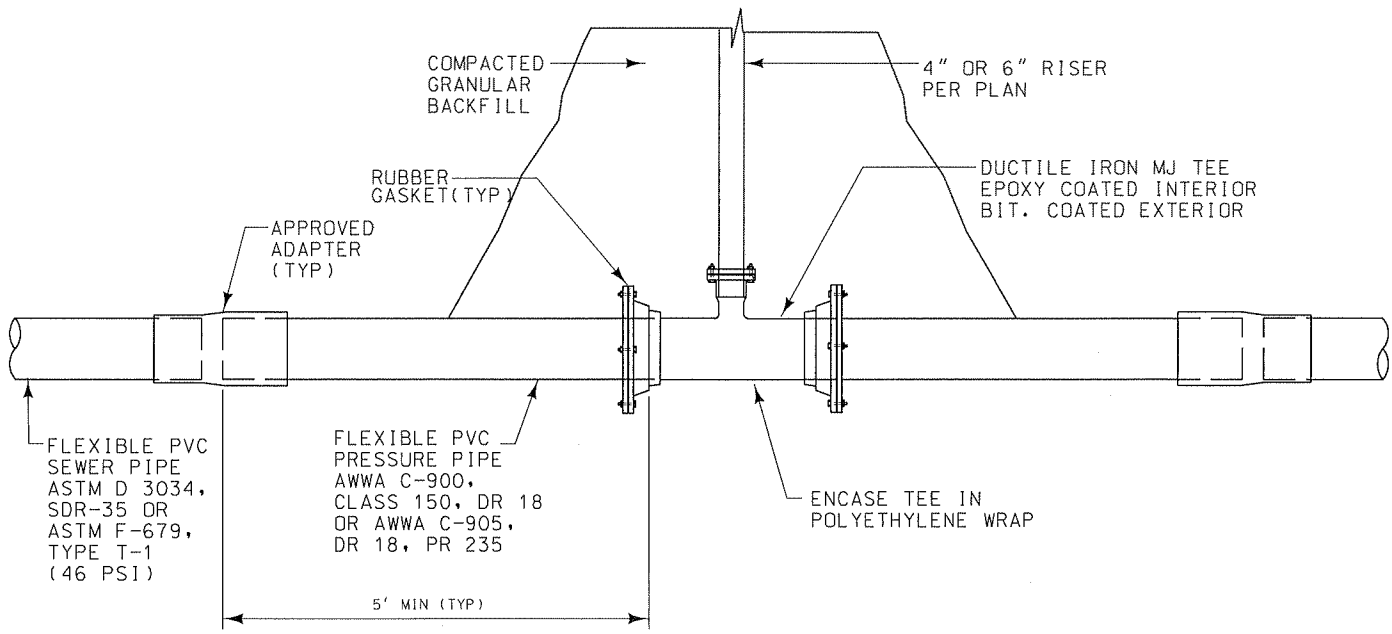
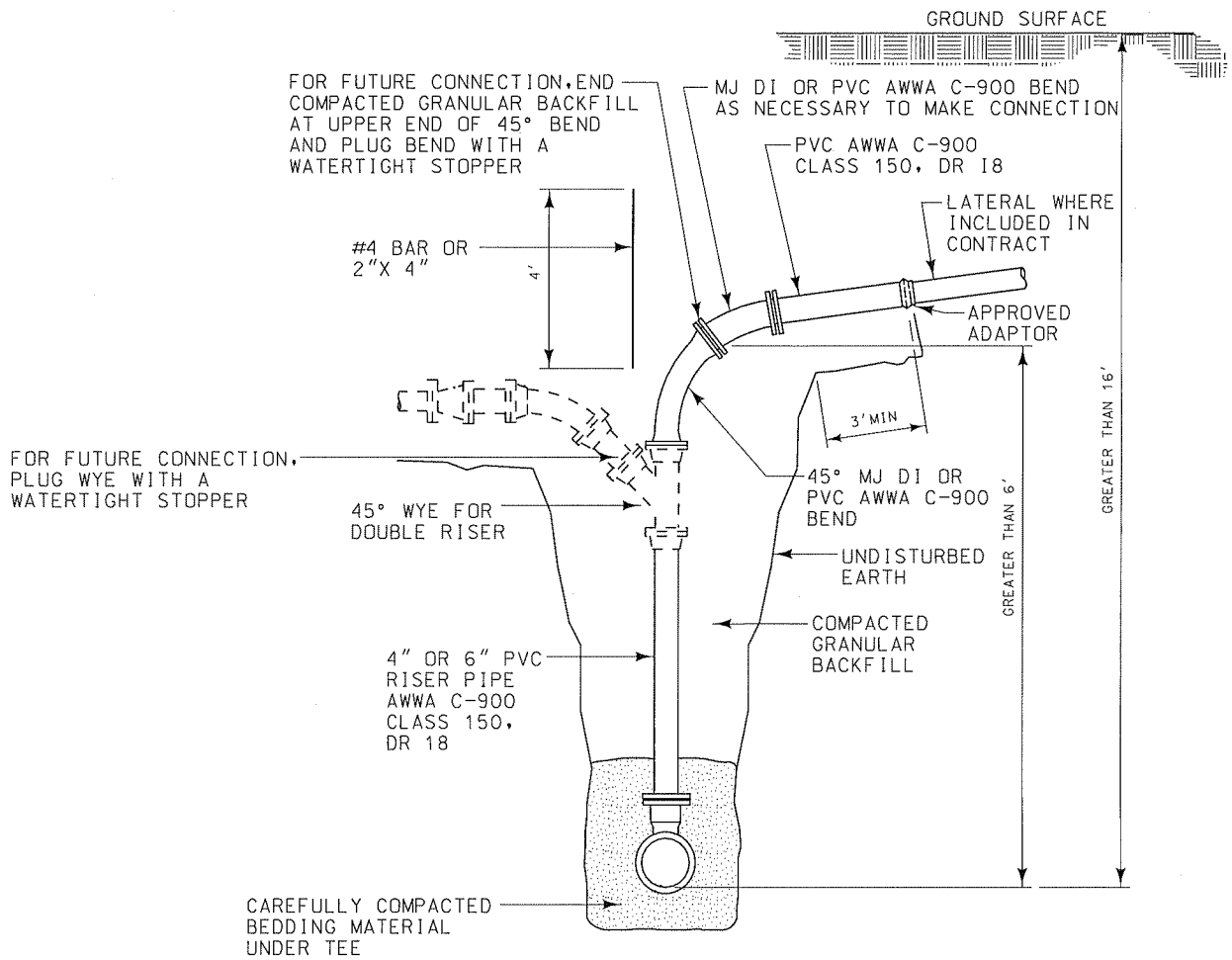


REF: SEC. 3.2.26

RISER DETAIL "TYPE D"  
FLEXIBLE RISER TO FLEXIBLE MAIN

NOT TO SCALE  
JULY 1987

FILE NO. 10E



## FLEXIBLE PRESSURE PIPE RISER TO RIGID TEE INSTALLED ON FLEXIBLE MAIN

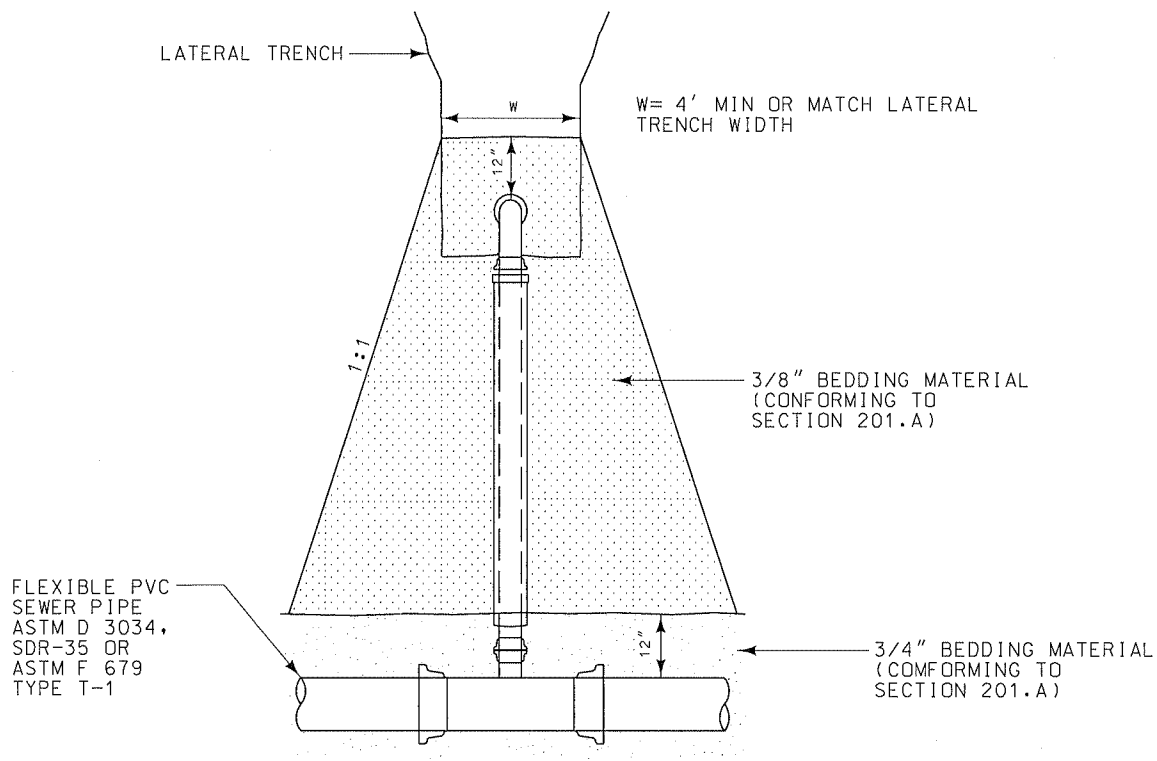
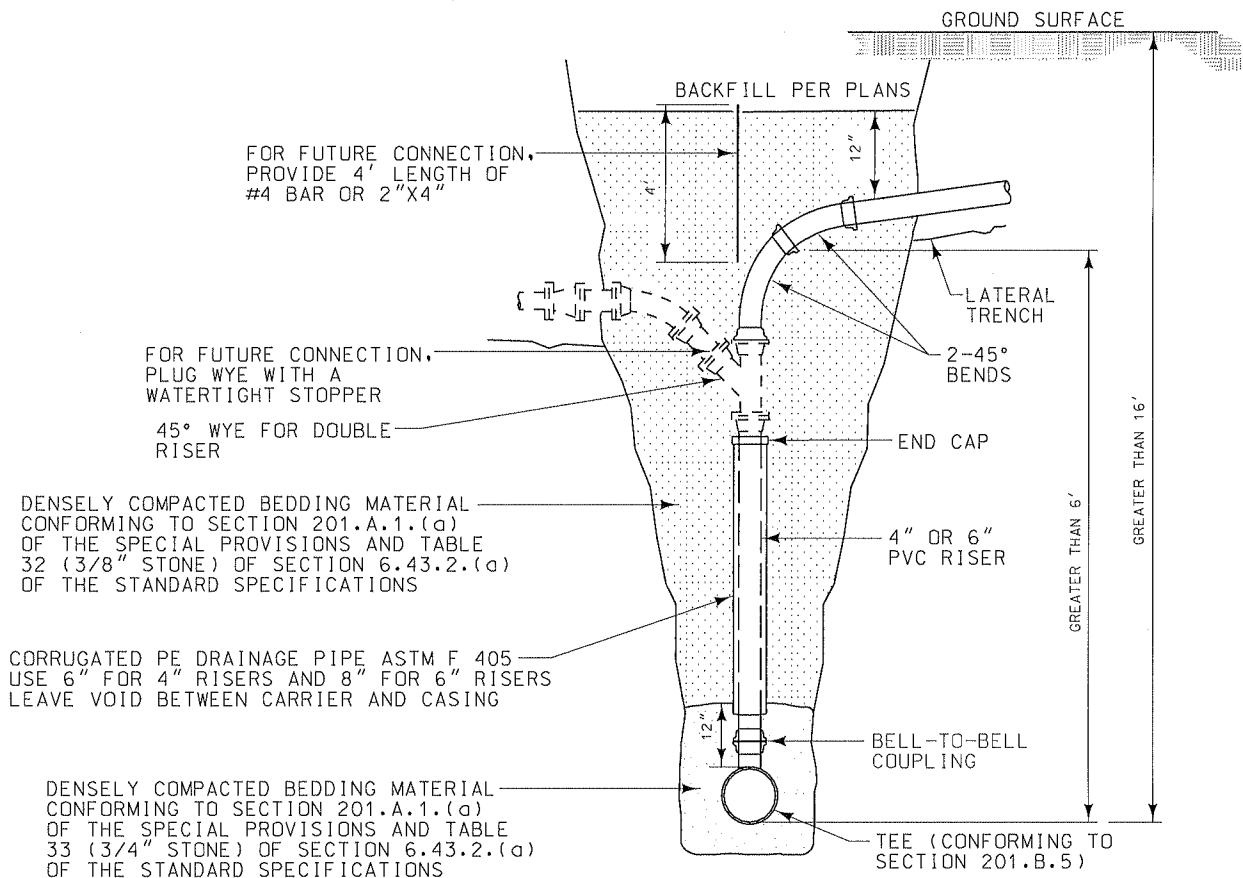
NO SCALE

CS

**CRISPELL-SNYDER, INC.**

PROFESSIONAL CONSULTANTS

Lake Geneva (262)348-5600 Madison (608)241-6271 Milwaukee Regional (262)250-8000  
Rosine (262)534-6330 Fox Valley (708)750-4822

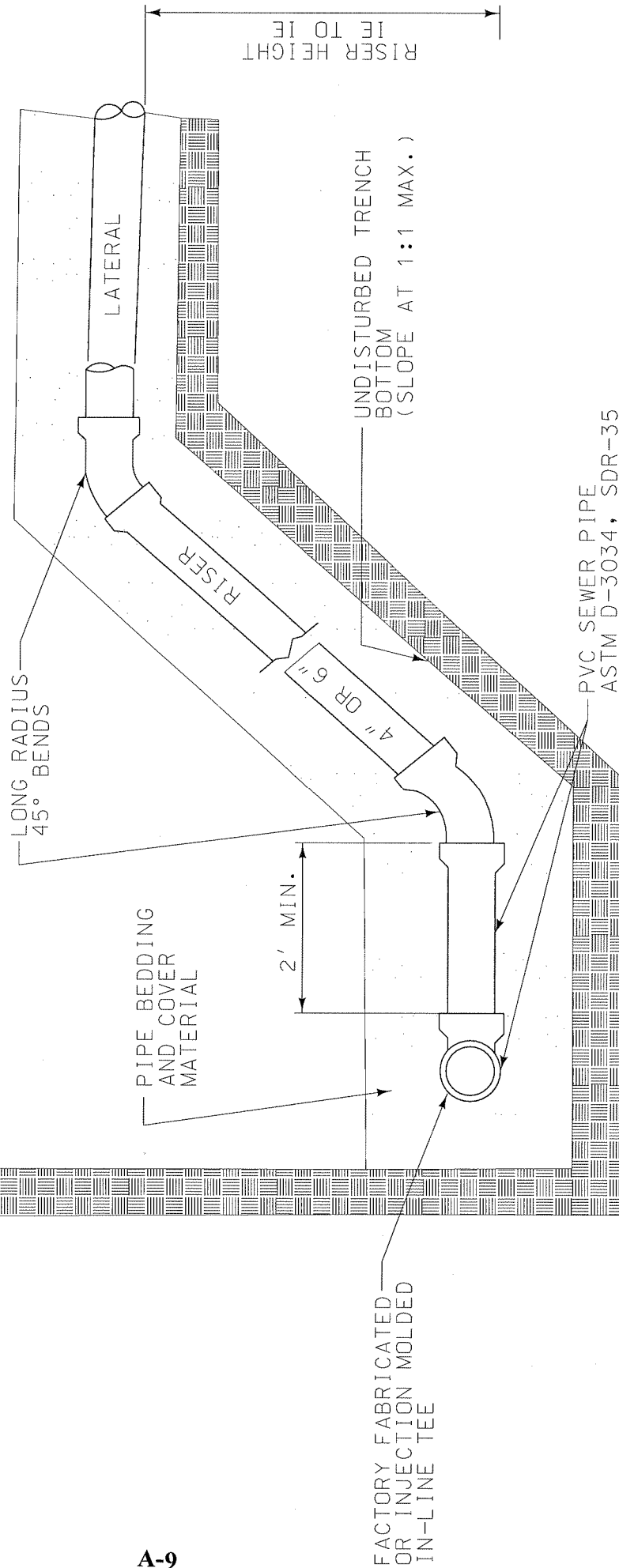


## FLEXIBLE RISER TO FLEXIBLE MAIN – DEEP BURIAL USE FOR 15", 21" & 27" PVC SEWERS

NO SCALE

GROUND SURFACE

BACKFILL PER PLAN AND SPEC



RISER HEIGHT  
IE TO IE

A-9

A-9

FLEXIBLE RISER TO FLEXIBLE MAIN (45 DEG.)

LOCATION:

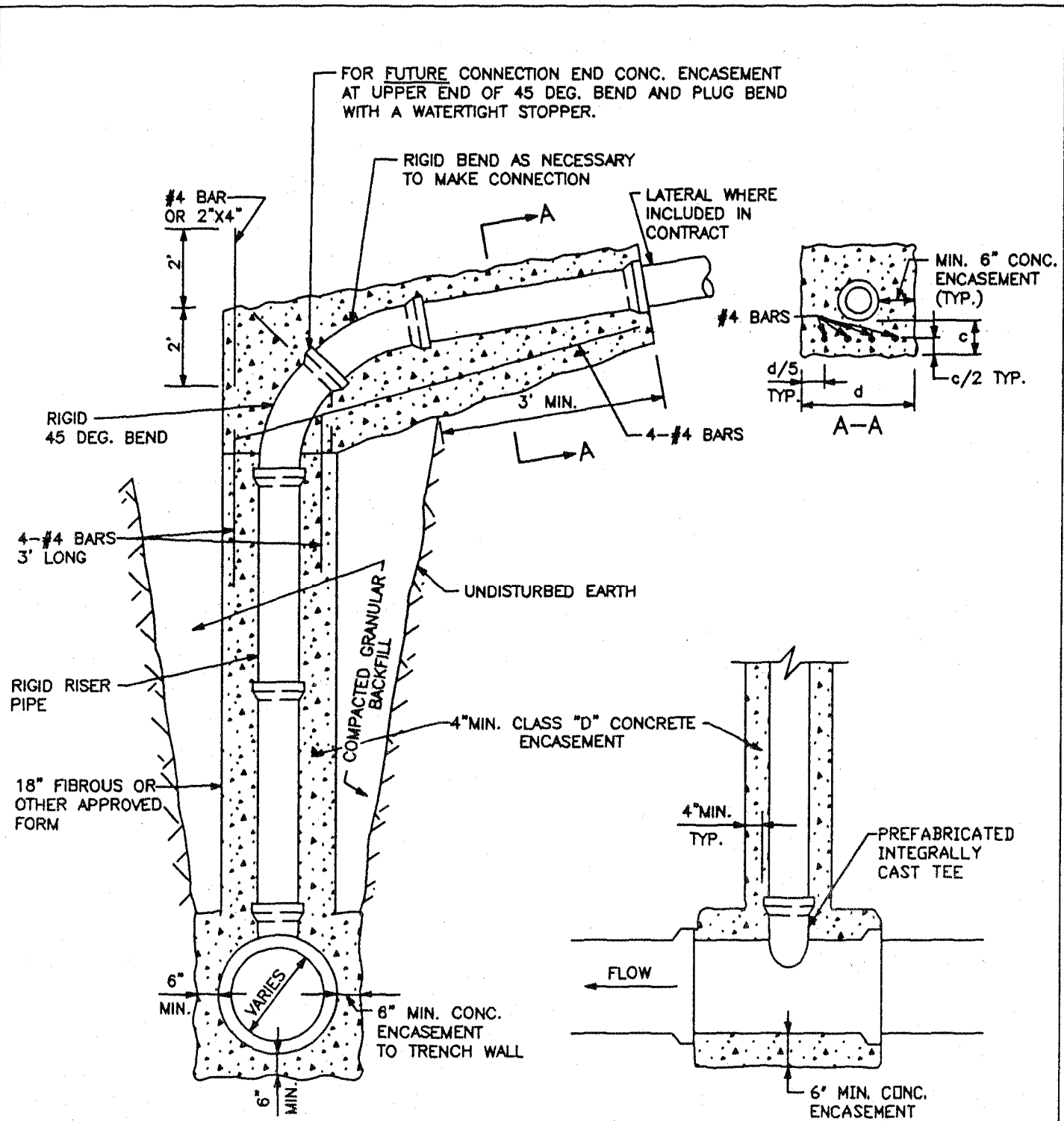
VILLAGE OF EAST TROY

SCALE: NONE

DATE: DECEMBER, 2007

DRAWN BY: C. ELVIN

**CRISPPELL-SNYDER, INC.**  
PROFESSIONAL CONSULTANTS  
Lake Geneva (262)348-5600 Madison (608)244-6277 Milwaukee Regional (262)250-8000  
Racine (262)554-8530 Fox Valley (715)752-4620



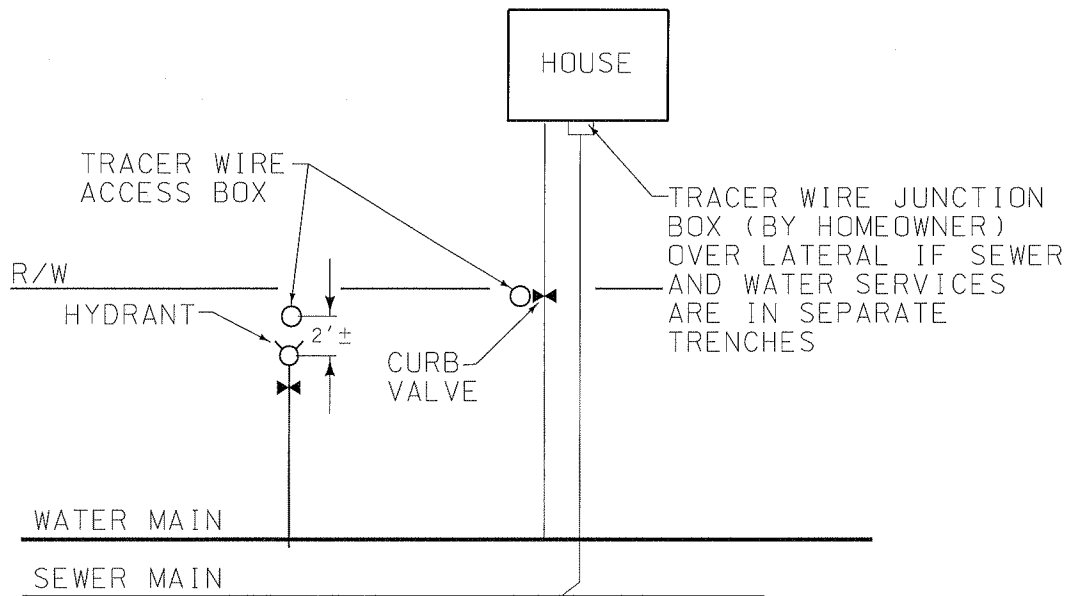
CONC. ENCASEMENT OF SEWERS 24" OR LARGER NOT REQUIRED

REF: SEC. 3.2.26

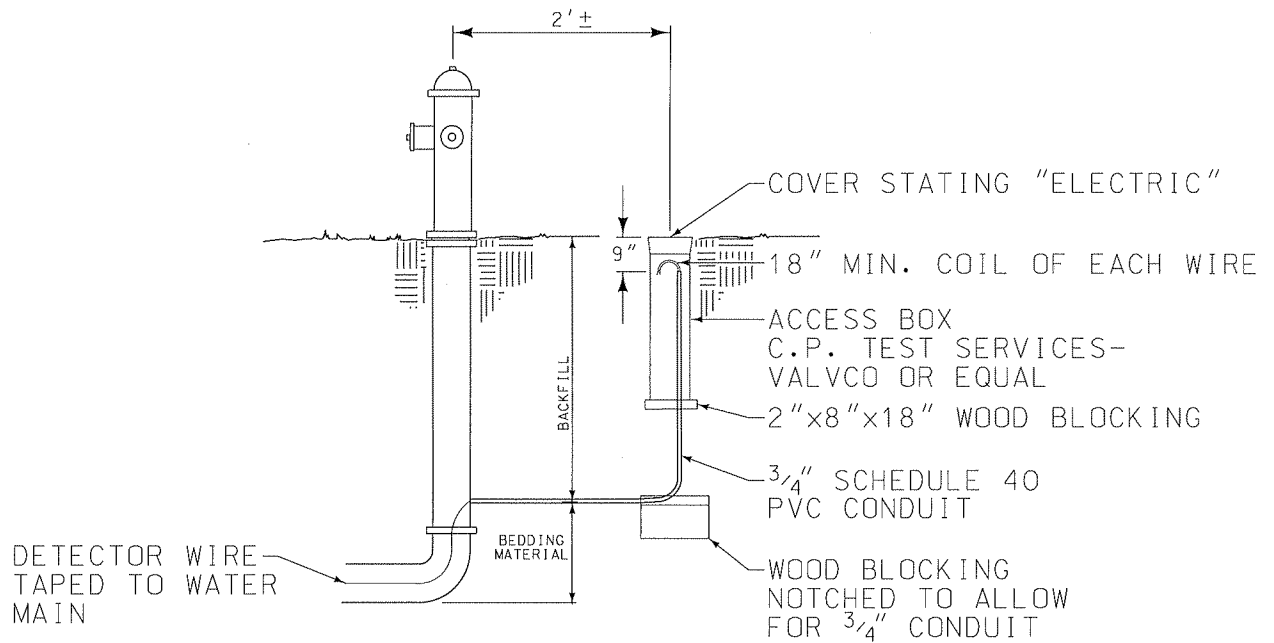
# RISER DETAIL "TYPE A" RIGID RISER TO RIGID MAIN

NOT TO SCALE  
JULY 1987

FILE NO. 10A



### TRACER WIRE ACCESS BOX LOCATIONS



### TRACER WIRE ACCESS BOX

PROJECT NAME

A-11



**CRISPELL-SNYDER, INC.**  
PROFESSIONAL CONSULTANTS

Lake Geneva (262)348-5600 Madison (608)244-6277 Milwaukee Regional (262)250-8000  
Racine (262)554-8530 Fox Valley (715)752-4620

LOCATION: VILLAGE OF EAST TROY

WALWORTH COUNTY, WISCONSIN

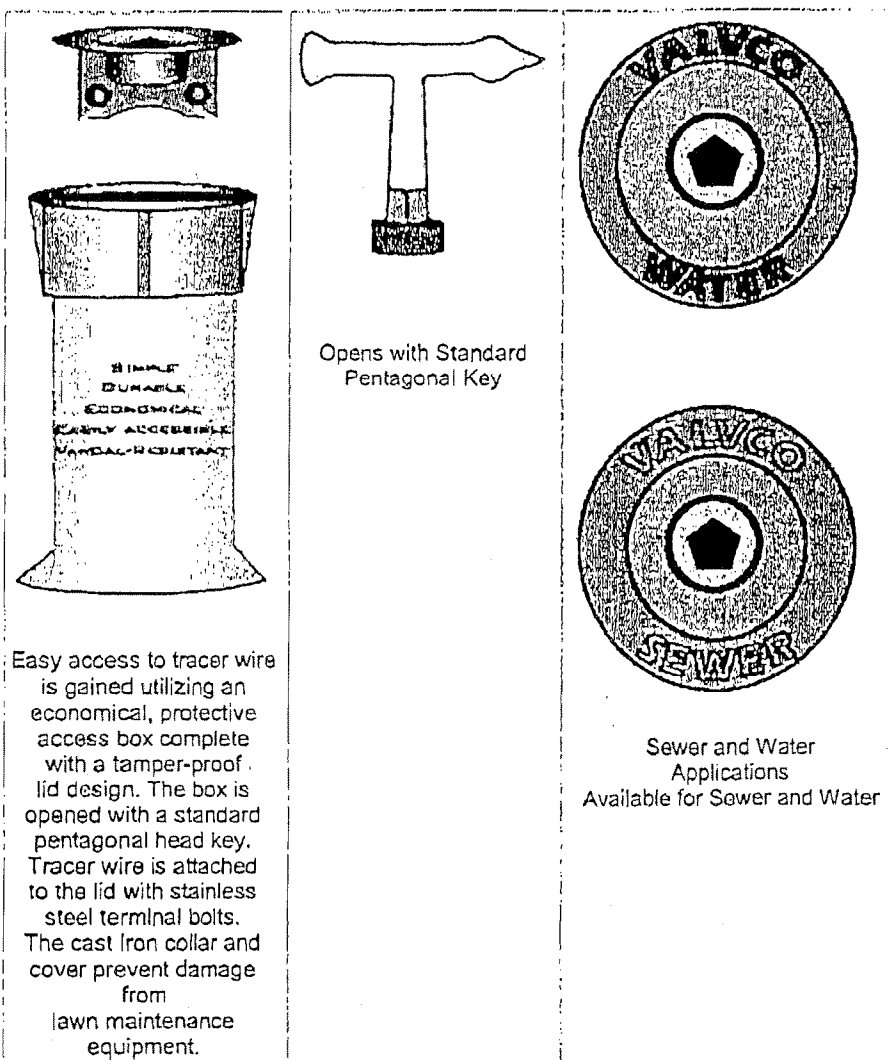
SCALE: NONE DATE: JANUARY, 2008

DRAWN BY: C. ELVIN

# FROM HD SUPPLY → FOR VILLAGE EAST TROY CP Test Services-VALVCO

## Tracer Wire Access Boxes

All tracer wires are to be connected to a combination cast iron & ABS tamper proof tracer wire access box. The cover is to be manufactured of cast iron and ABS components produced in the USA. Cast iron collar & cover is to be manufactured in accordance with ASTM A 48 Class 25. The ABS is to be manufactured in accordance with ASTM D 1788. The cover shall be lettered Electric and shall have a standard AWWA size cast-in pentagonal bolt. This unit is to be manufactured by C.P. Test Services-Valvco, Inc. under provisional US patent rights.

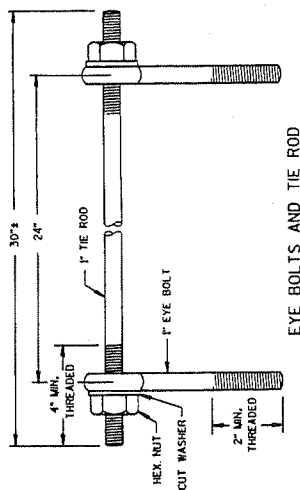
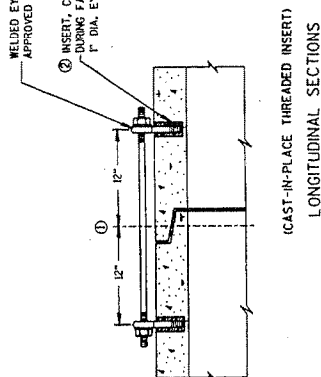
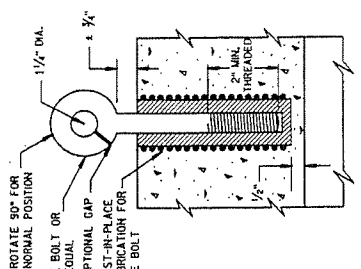


# GENERAL NOTES

CONCRETE CULVERT PIPE SHALL BE TIED TOGETHER IN THE MANNER ILLUSTRATED BY THIS DETAIL AT LOCATIONS DESIGNATED ON THE PLAN. THE CONTRACTOR MAY USE EITHER ALTERNATE 1, 2 OR 3 FOR DRAINAGE STRUCTURES. ONLY ALTERNATE 1 AND 3 MAY BE USED FOR CATTLE PASSES, UNLESS OTHERWISE STATED IN THE CONTRACT. THE MATERIALS, FABRICATION AND WORK NECESSARY TO THE CULVERT PIPE AS INDICATED ON THE PLANS AND BY THIS DETAIL WILL BE CONSIDERED NECESSARY TO THE CULVERT PIPE REINFORCED CONCRETE CULVERT PIPE, OR REINFORCED CONCRETE PIPE CATTLE PASS.

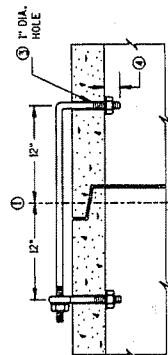
DETAILED DRAWINGS FOR PROPOSED ALTERNATE DESIGNS FOR JOINT TIES SHALL BE SUBMITTED TO THE ENGINEER FOR APPROVAL.

- ① 1/2" OF TONGUE AND GROOVE OR BELL AND SPIGOT JOINTS.
- ② THE INSIDE OF THE THREADED INSERTS SHALL BE CLEAN TO ALLOW THE INSERTION OF THREADED EYE BOLTS.
- ③ HOLES SHALL BE CAST-IN-PLACE OR DRILLED 12" FROM 1/2" OF TONGUE AND GROOVE.
- ④ BOLT PROJECTION INSIDE OF PIPE SHALL NOT EXCEED 2".
- ⑤ ROD DIAMETER + 1/4" INCH.
- ⑥ LENGTH ADEQUATE TO EXTEND TO WITHIN 1/2" INCH OF THE INNER SURFACE OF THE PIPE.

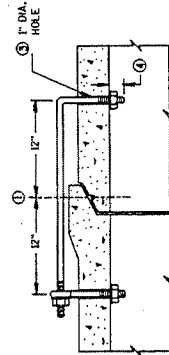


EYE BOLTS AND TIE ROD

## EYE BOLT AND TIE ROD ASSEMBLY (ALTERNATE NO. 1)

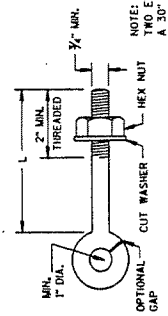


(TONGUE & GROOVE PIPE)



(MODIFIED BELL PIPE)

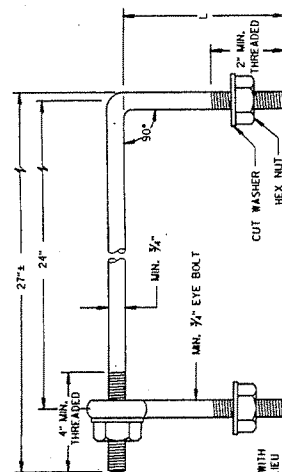
### LONGITUDINAL SECTION



EYE BOLT

NOTE: TWO EYE BOLTS MAY BE USED WITH A 3/4\"/>

## EYE BOLT AND TIE ROD ASSEMBLY (ALTERNATE NO. 2)



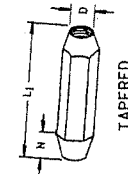
EYE BOLT AND TIE ROD

(JOINT TIES FOR 18\"/>

ADJUSTABLE TIE ROD TABLE

PIPE DIAMETER	TIE ROD DIAMETER	D	L <sub>1</sub>	N
12-60	3/4"	3/4"	5	1/2
66-84	3/4"	3/4"	5	1/2
90-108	1"	1"	7	1 1/4

DIMENSIONS SHOWN ARE IN INCHES

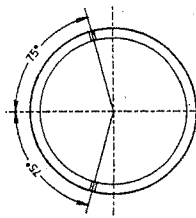


TAPERED

PLAIN

RIGHT AND LEFT THREADS SLEEVE NUTS

TRANSVERSE SECTION



PLACEMENT OF (D) CAST-IN-PLACE INSERTS OR HOLES DURING FABRICATION FOR PIPE SECTIONS REQUIRING TIE RODS

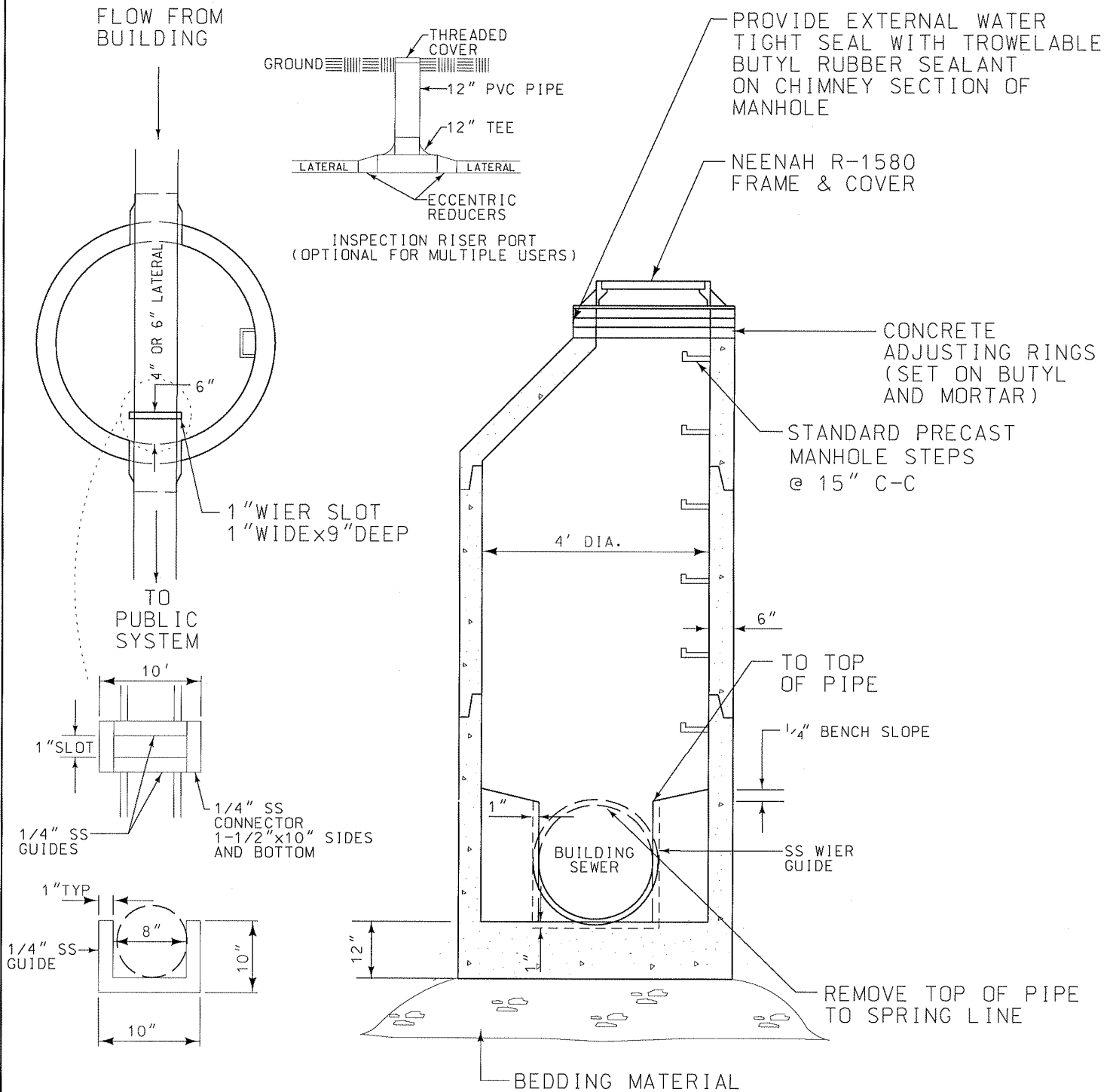
JOINT TIES FOR CONCRETE PIPE

STATE OF WISCONSIN  
DEPARTMENT OF TRANSPORTATION

APPROVED  
DATE  
STATE DESIGN ENGINEER FOR HWY'S

S.D.D. 8 F 4-5

REVISION/PLOT DATE



PROVIDE 5 FEET MINIMUM  
OF STRAIGHT PIPE EACH  
SIDE OF MANHOLE.

SEE SECTION 210 OF EAST TROY  
SPECIAL PROVISIONS FOR  
ADDITIONAL MANHOLE DETAILS.

## BUILDING SEWER INSPECTION / SAMPLING MANHOLE DETAIL

PROJECT NAME

A-14

**CRISPELL-SNYDER, INC.**  
PROFESSIONAL CONSULTANTS

Lake Geneva (262)348-5600 Madison (608)244-6277 Milwaukee Regional (262)250-8000  
Racine (262)554-8530 Fox Valley (715)752-4620

LOCATION: VILLAGE OF EAST TROY

WALWORTH COUNTY, WISCONSIN

SCALE: NONE DATE: JANUARY, 2008

DRAWN BY: C. ELVIN

## 2500. VILLAGE INSPECTION

### A. Schedule.

1. The Village Director of Public Works will inspect all completed work in accordance with the schedules listed below.
2. Utility projects will be inspected in accordance with the following minimum inspection schedule:
  - a. After substantial completion of utilities.
  - b. After completion of pavement and lawn restoration.
  - c. In the spring time after lawns have been established.
  - d. Prior to final acceptance.
3. Road projects will be inspected in accordance with the following minimum inspection schedule:
  - a. Immediately prior to placement of asphaltic binder course.
  - b. After lawns have been established.
  - c. Immediately prior to placement of asphaltic surface course.
  - d. Prior to final acceptance.

### B. Contractor to Assist in Inspection.

1. The Contractor shall inspect all work and correct or repair any deficiencies prior to inspection by the Village DPW. The Contractor shall notify the Village when the work is ready for inspection.
2. The Contractor or his representative shall accompany and assist the DPW during the inspection. Assistance to be provided by the Contractor includes:
  - a. Remove manhole covers.
  - b. Open water main valves.
  - c. Loosen water service curb valve plugs.
  - d. Remove caps from fire hydrants.
  - e. Remove catch basin grates.

- f. Replace, tighten, or close all items noted above.
- g. Provide other assistance as required.

C. Work Completed Prior to Inspection.

The following items of work shall be completed prior to Village inspection.

1. Lot Numbers.
  - a. All lots in new subdivision shall be numbered in the field.
  - b. Numbers shall correspond with platted lot numbers and shall be referenced in the sewer TV tape and report.
2. Small Scale Maps.
  - a. Provide the Village with 8-1/2" x 11" utility maps (separate map for each utility).
  - b. The entire site shall be shown on one sheet and shall include streets, lots, and lot numbers.
3. Fire Hydrants.
  - a. Painted with color coding.
  - b. At finish grade with the bury mark at lawn grade.
4. Steep Slopes.
  - a. All slopes including temporary stockpiles graded at 4:1 maximum slopes.
5. Erosion Control.
  - a. Erosion control devices in place and maintained.
6. Debris.
  - a. Dispose of all roots, stones, and other debris.

## 2000. DESIGN GUIDELINES

### A. Street Width.

1. Typical residential street is 36 feet face-to-face of curb.

### B. Curb and Gutter.

1. Use Village standard 30 inch rolled type curb and gutter section.

### C. Sidewalks.

1. Construct sidewalks in new subdivisions on one side of the street only.
2. Construct sidewalks to individual lots just prior to occupancy.
  - a. Alternate: Construct after all houses have been completed with Village approval.

### D. Residential Pavement Section.

1. 10" crushed aggregate base course (2 lifts).
2. 3" asphaltic concrete pavement (1-1/2" binder - 1-1/2" surface).

### E. Utility Locations.

1. Place sanitary sewer on street centerline.
2. Place water mains 10 feet north and east of centerline.
3. Place storm sewers 10 feet south and west of centerline.
4. Water Valves.
  - a. Place valves at intersecting right-of-way lines at street intersections and 5 feet off hydrants at midblock.
5. Hydrants.
  - a. Place 5 feet back of curb with auxiliary valve 3 feet from hydrant.
  - b. Locate hydrants in cul-de-sacs on a lot line (not at the far end or back of the cul-de-sac) to provide room for snow storage at the back of the cul-de-sac.

6. Sewer and Water Services:
  - a. Typically end at right-of-way line.
  - b. End both sewer laterals and water services at the curb box with Village approval.
- F. Water Tower.
  1. Overflow Elevation = 1,014.92
  2. Low Water Elevation = 1,000.00
- G. Storm Sewer Sizing.
  1. Design storm sewers to handle the 10 year developed rainfall.
- H. Detention/Retention Ponds.
  1. Detention/retention ponds, if required by the Village, shall be sized to store runoff from a 100-year storm under developed conditions while discharging at a rate equal to the runoff from a 10-year storm under existing conditions. In addition, the outlet shall be restricted to retain runoff from low flows using a weir or other similar device.
- I. Asphaltic Paving.
  1. Schedule.
    - a. Place binder course only (by November 1<sup>st</sup>) the year that utility and road improvements are constructed.
    - b. Place surface course (by October 15<sup>th</sup>) after 50% of homes have been completed, but not later than two years after placing the binder course.
  2. Manhole Wedges.
    - a. Place manhole and valve box covers ¼ inch below finish grade.
    - b. Place asphaltic wedges around manholes and valve boxes.
      - (1) Optional - May turn valve boxes down.
      - (2) Extend wedges to 3 feet beyond manholes and valve boxes.
    - c. Protect edges of concrete gutter by ramping up to match the top edge (flange) of gutters.

- d. Remove wedges and ramps by milling prior to placing the surface course.
- J. Utility Trench Backfill.
  - 1. Granular Backfill.
    - a. Used granular backfill within existing or proposed paved or graveled areas.
    - b. Excavated granular materials (including sand) may be used as granular backfill.
  - 2. Excavated Material Backfill.
    - a. Utility trenches, may be backfilled with excavated material backfill outside of existing or proposed paved or graveled areas.
- K. Maximum Grading Slope.
  - 1. The maximum slope of all excavations, including ditches and temporary earth stockpiles, shall be 4:1.
- L. Gravel Surfaces Prohibited.
  - 1. All new or reconstructed roads, driveways, parking areas, etc., shall have either an asphaltic or concrete surface. New gravel surfaces are prohibited by Village ordinance.
- M. Snow Storage Easement.
  - 1. Provide snow storage easement(s) on cul-de-sacs.
- N. Sewage Lift Station.
  - 1. Use wet well-dry well type only.
- O. Special Conditions.
  - 1. The Village's "Special Provisions" may be modified through "Special Conditions" with Village approval.
  - 2. Items requiring modifications may include: 1) Backfill requirements; 2) Work or phasing schedule; 3) Earthwork measurement/payment procedures; and 4) lawn restoration requirements.

**SAMPLE**

SPECIAL CONDITIONS

\_\_\_\_\_ SUBDIVISION DEVELOPMENT  
VILLAGE OF EAST TROY  
PROJECT NO. \_\_\_\_\_

I. SPECIFICATIONS

- A. Work on this project shall be in accordance with the Special Provisions of the Village of East Troy, dated \_\_\_\_\_, as amended by these Special Conditions.

II. AMENDMENTS TO SPECIAL PROVISIONS

A. Work.

1. Amend Subsection 101.A.2 as follows:

- a. The work is shown on the plans identified by \_\_\_\_\_.
- b. Only Phase \_\_\_\_ work is being done under this contract.

B. Soil Borings.

1. Add Subsection 104.C as follows:

- C. Soil borings (are) (are not) available for this project. Soil investigations were performed by \_\_\_\_\_.

C. Storm Sewer Materials. (Note: Requires Village approval for alternate materials.)

1. Amend Subsection 405.A. to allow the following storm sewer pipe materials:

D. Catch Basins.

1. Amend Section 415 to require \_\_\_\_\_ catch basins to be constructed in accordance with the attached catch basin details.
2. Catch basin grates used \_\_\_\_\_ shall be Neenah –R\_\_\_\_.

E. Water Samples.

1. Add Paragraph 555.B.3 as follows:
3. Obtain safe water samples from the following locations:

- a. \_\_\_\_\_
- b. \_\_\_\_\_
- c. \_\_\_\_\_

F. Casing Pipe.

- 1. Amend Paragraph 610.D.1 to add the following minimum thicknesses for casing pipe.

- a. \_\_\_\_\_
- b. \_\_\_\_\_

G. Disposal of Surplus Excavated Material.

- 1. Add Paragraph 700.E.2.a.(1) as follows:

- a. Surplus excavated material shall be disposed of at \_\_\_\_\_.

H. Street Classifications.

- 1. Add Paragraph 900.A.1.c as follows:

- c. Maintain a minimum of one lane of traffic on the following streets:

- (1) \_\_\_\_\_
- (2) \_\_\_\_\_

I. Detours.

- 1. Add Paragraphs 900.D.1.a and b as follows:

- a. Traffic may be detoured from the following streets:

- (1) \_\_\_\_\_
- (2) \_\_\_\_\_

- b. Detour routes shall be as specified below:

- (1) \_\_\_\_\_

- J.     Unclassified Excavation – Definition.
  - 1.     Amend Subsection 1205.1.A to delete pavement removal and topsoil stripping from the bid item for unclassified excavation or amend this item to include additional work.
- K.     Earthwork Quantities.
  - 1.     Amend Subsection 1205.1.F.1 to include quantities of grading work.
- L.     Site Grading.
  - 1.     Amend Section 1205.3, Site Grading, as required.
- M.     Pavement Type.
  - 1.     Amend Subsection 1407.A if Type MV asphaltic pavement mix is required on roads with heavy traffic volumes.
- N.     Sidewalk and Concrete Driveway Joints.
  - 1.     Amend Paragraph 1602.C.4 if additional joint data is required.
- O.     Topsoil Stripping.
  - 1.     Amend Subsection 1625.B to specify limits of topsoil stripping.
- P.     Topsoil.
  - 1.     Amend Subsection 1625.D to specify the method(s) of payment for topsoil and salvaged topsoil.
- Q.     Appendix.
  - 1.     Add Appendix items as required.